

ASTOUNDING

AUG. '41

SCIENCE-FICTION

A STREET & SMITH PUBLICATION

JURISDICTION

by NAT SCHACHNER

AUGUST • 1941

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infectious dandruff

is more annoying still!

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first sign of trouble

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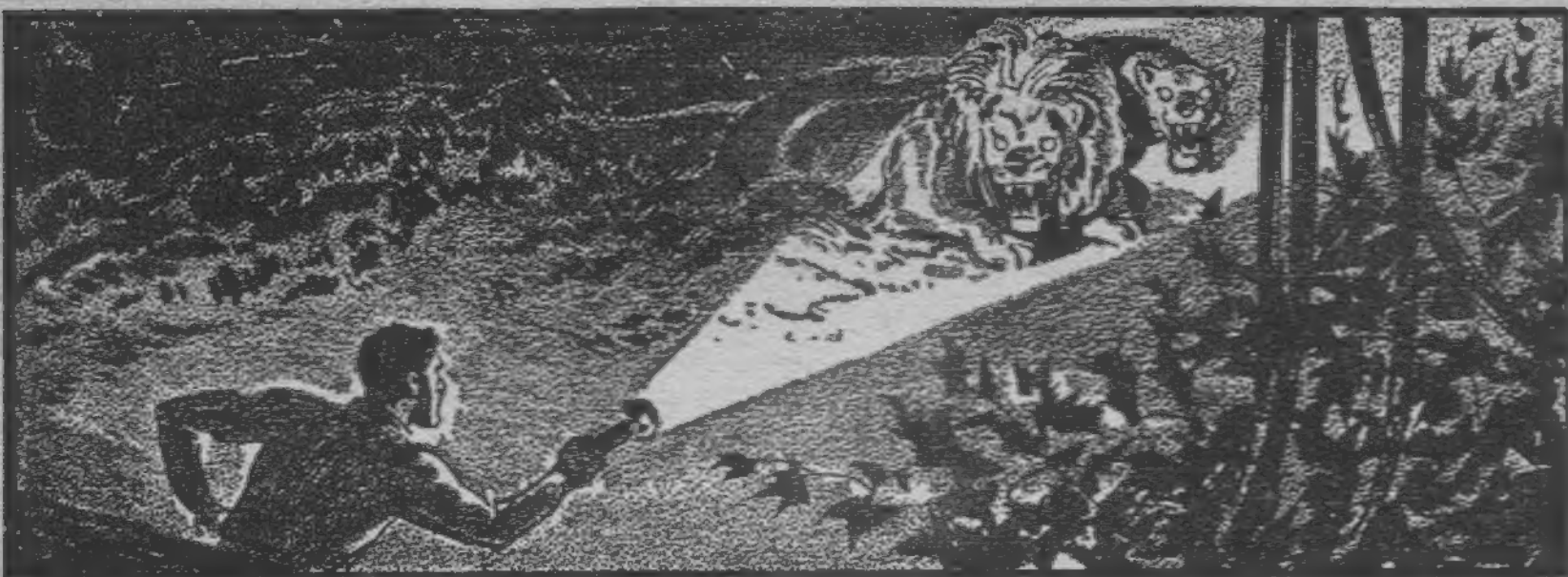
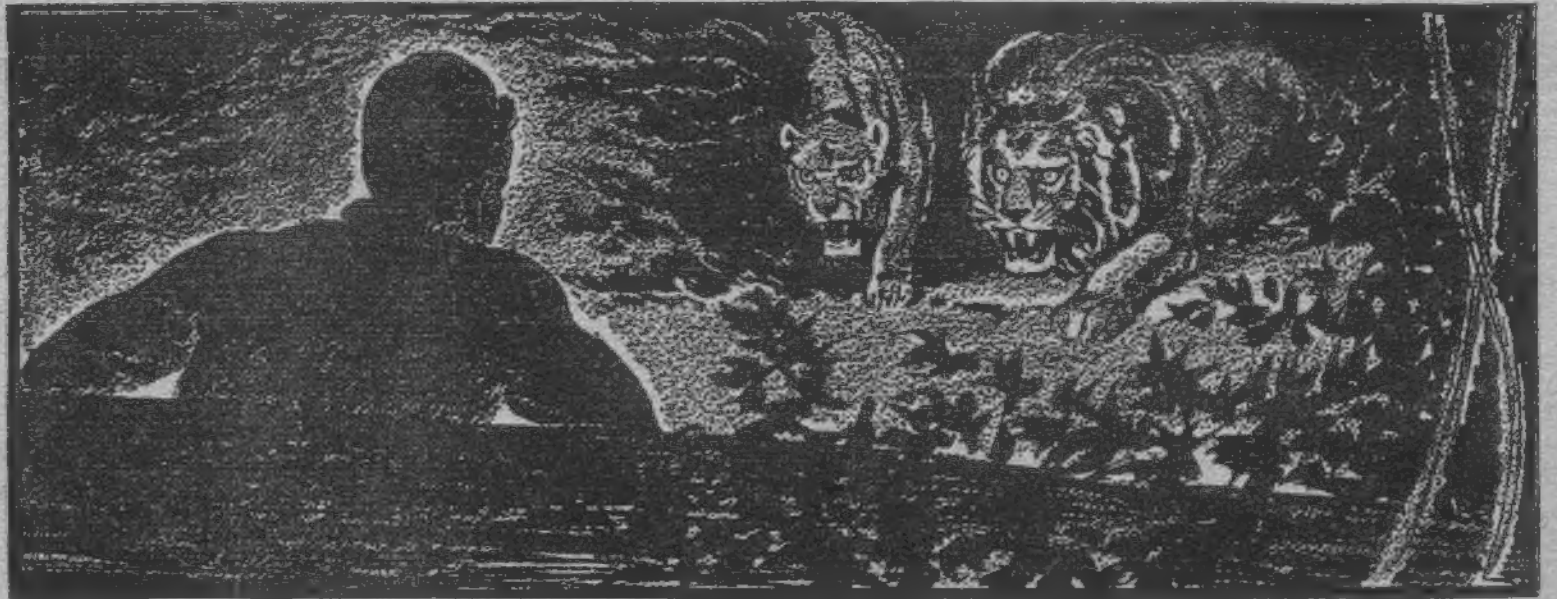
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COVER BY ROGERS

All stories in this magazine are fiction. No actual persons are designated either by name or character. Any similarity is coincidental.

Monthly publication issued by Street & Smith Publications, Incorporated, 79 Seventh Avenue, New York City. Allen L. Grammer, President; Henry W. Ralston, Vice President; Gerald H. Smith, Treasurer and Secretary. Copyright, 1941, in U. S. A. and Great Britain by Street & Smith Publications, Inc. Reentered as Second-class Matter, February 7, 1938, at the Post Office at New York, under Act of Congress of March 3, 1879. Subscriptions to Countries in Pan American Union, \$2.25 per year; elsewhere, \$2.75 per year. We cannot accept responsibility for unsolicited manuscripts or artwork. Any material submitted must include return postage.

Printed in  the U. S. A.

STREET & SMITH PUBLICATIONS, INC. • 79 7th AVE., NEW YORK

OUT THIRD
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Next Issue on
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ATOMIC POWER vs. COAL

THE energy concentration possible in atomic power, with the resultant cheapness of energy obtained from such a source, would seem a pretty solid assurance that the laborious mining of coal will cease as soon as the atom goes to work.

That may well be a mere "seeming" however—for coal is very far from being no more than a source of energy. One thing it is hard to appreciate is the supendous amount of coal the United States consumes in a single year, a quantity that, singly, exceeds in mass the entire sum total of *all other things produced*. The weight of iron, foods, textiles, paper, oil products, copper, the other secondary metals, all added together, is not equal to the annual consumption of that one other item—coal.

The consumption of coal is so great, in fact, that a material which is present in coal as a very minor impurity can be the basis of a major industry. Sulphur is present in only very small amounts in coal—but New York City's chimneys produce some 2,000 tons of sulphur dioxide on a snappy winter day. Because coal contains a small amount of tar in addition to the main substance—carbon—that portion of the coal which is processed in coking ovens yields some 100,000,000 gallons of benzol, 20,000,000 gallons of toluol, 1,000,000,000 pounds of ammonium sulphate, 50,000,000 pounds of ammonia, and 560,000,000 gallons of tar in one year. Benzol and toluol, as well as other compounds found in the tar, are all important source materials for the growing plastics industries, as well as supplying adequately the dye-stuffs industry and helping out the dry cleaners. The ammonium sulphate and ammonia go into fertilizers and explosives. (Atomic explosives, incidentally, won't be usable for such purposes as quarrying, mining, tunneling, et cetera. They're too intense. The miner wants a slow, heavy explosive that gives a grunt and a heave, not an abrupt, violent crack-o'-doom riving blow.)

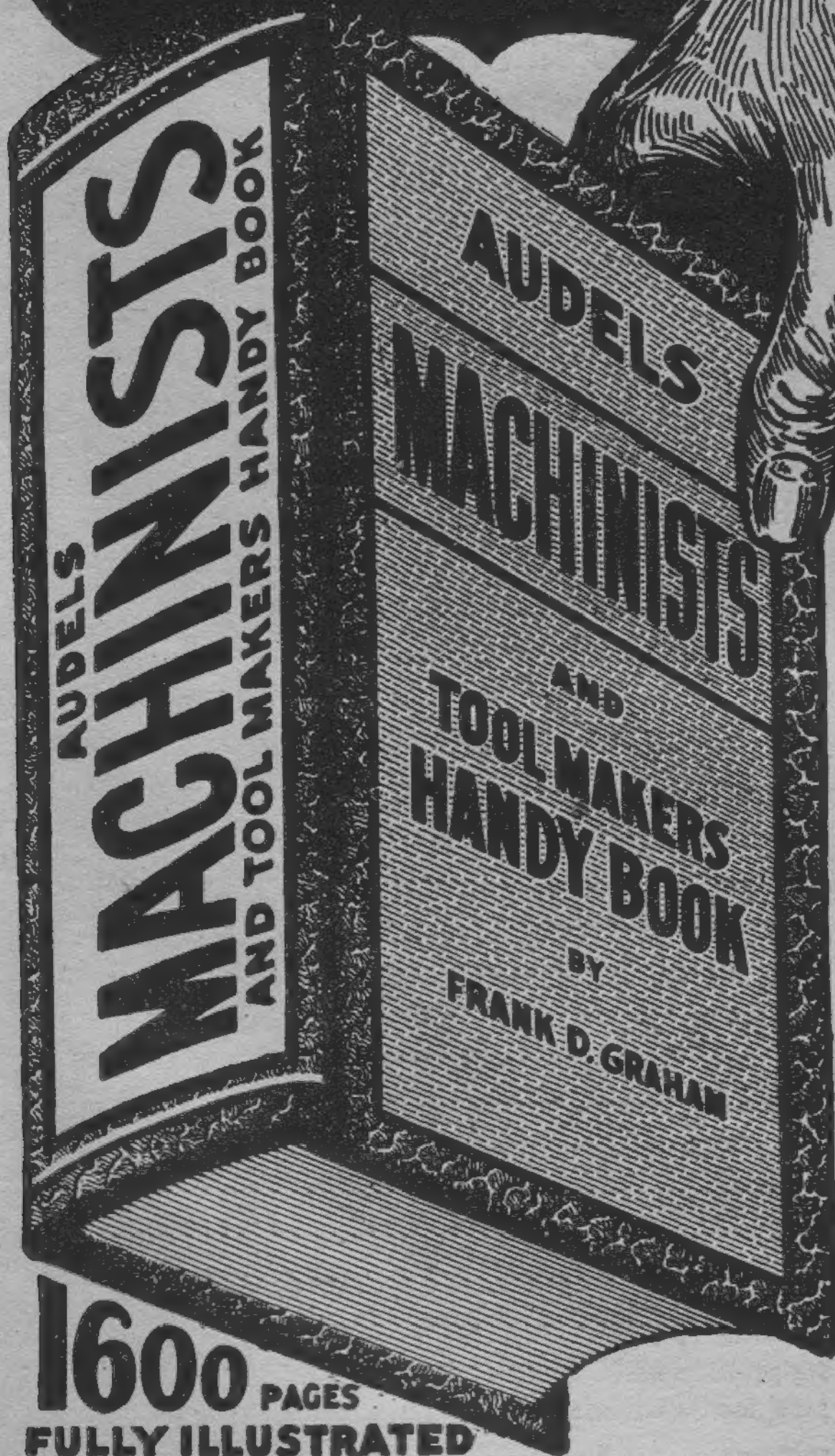
Coal is used in huge quantities not alone for power, but in its role of chemical reducing agent. In a blast furnace, coal heats the ore, true enough—but you can heat that iron oxide to incandescence from now to doomsday by electric power and still have no iron. Carbon reduces iron oxide to iron, yielding carbon dioxide. Of course, you could use electric power to electroplate out the iron in an acid bath—but a blast furnace is cheaper to build and operate even if the energy to generate electricity costs nothing. Iron, copper, lead, zinc—all the metals of commerce are produced by the reducing action of coal at one point or another.

Atomic power may replace coal as an energy source in one respect—but coal will remain for unguessable ages as man's prime source of the chemical substance carbon, and a whole raft of immensely valuable and important carbon compounds. It's cheap, it's plentiful, it's easy to handle, it has desirable physical properties that make an ore-melt porous, and it contains quantities of useful organic carbon and nitrogen compounds ready made in easily recoverable form.

Coal's dirty stuff—but wonderfully useful, atomic energy or not!

THE EDITOR.

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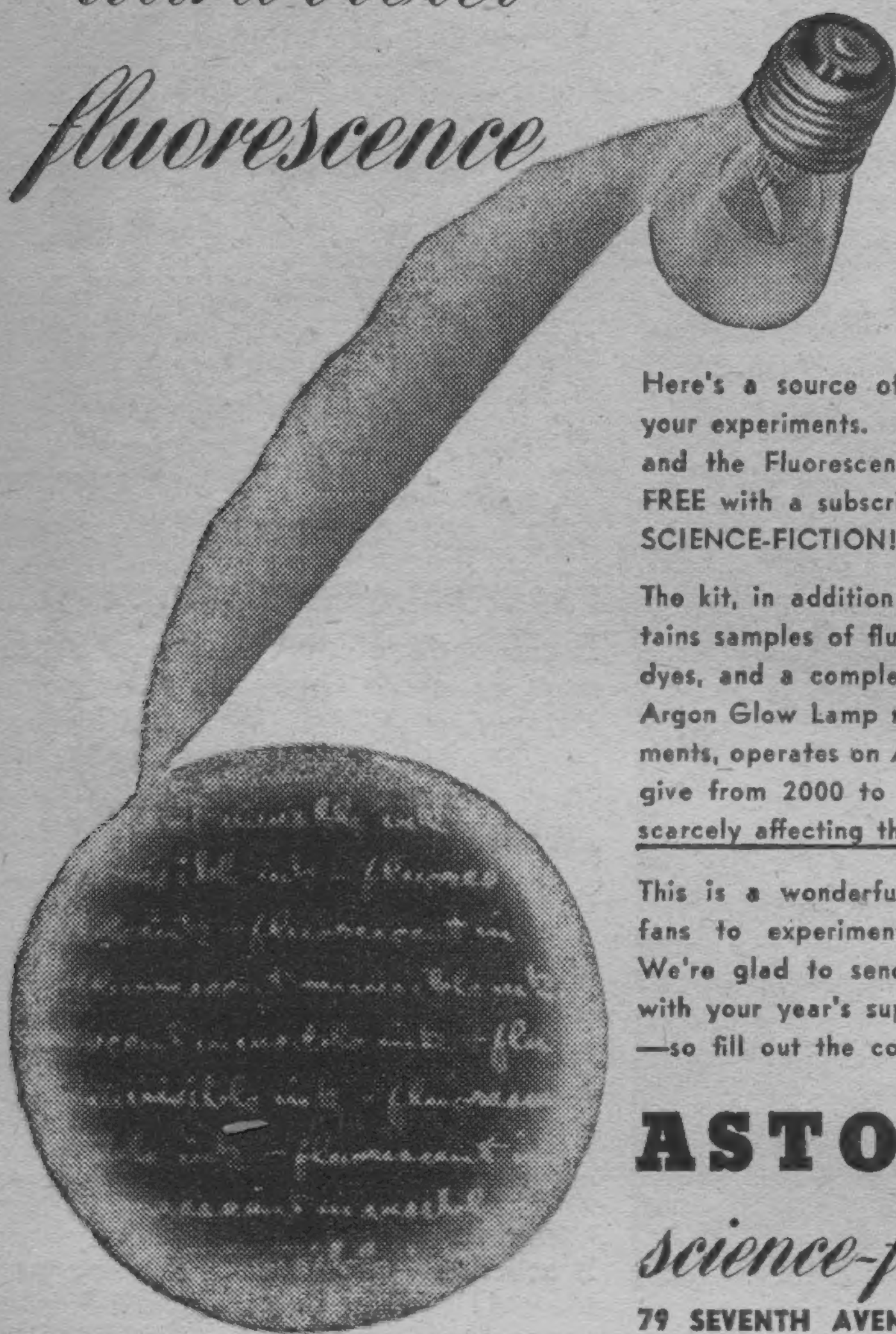
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JURISDICTION

By Nat Schachner

Kerry Dale, sky-lawyer, proves a crook may be smart at sabotage, murder and assorted crime, but it takes a navigator to steal a sky-mine!

Illustrated by Schneeman

SIMEON KENTON, of Kenton Space Enterprises, Unlimited, was in a terrific temper. He paced up and down the confines of his office with short, rapid steps that tossed his deceptive halo of white hair into utter con-

fusion. His mildly whiskered saint's visage was screwed up into unutterable knots. In his tight-clutched fingers was a blue spacegram which he shook violently at his daughter at each choking pause in his peroration.

"Dadblast that dingfoodled young scalawag of a Kerry Dale!" he exploded. "Look at this, will you? Of all the impudent, soncarned—I mean condarned—damn it, you know what I mean!" When Simeon Kenton was exasperated, his tongue had a habit of twisting and stumbling over the quick rush of his ideas.

"I think I know what you mean," his daughter, Sally, admitted demurely. Her eyes danced and secreted understanding, albeit slightly wicked, humor. She loved her irascible father, who was known to all and sundry as Old Fireball because of his habit of exploding on the slightest provocation. They might tilt at each other and parry deft strokes for the sheer intellectual joy of the thing, but underneath her slim, proud beauty there functioned a brain as keen and hard as the one that had propelled old Simeon to the commanding position he had achieved on the spaceways and in the industrial marts of the System.

Simeon Kenton, sole owner and guiding intelligence of the far-flung Kenton Space Enterprises, was more than a power. He was an institution. His spaceships traveled the charted lanes from Venus to the Jovian satellites and poked their sleek noses inquiringly into those reaches as yet unexplored. His word was the law and the prophets to thousands of hard-bitten spacemen who swore with many a public oath at his tyranny and wouldn't have exchanged it for the softest-cushioned job with any other outfit. Even the Interplanetary Commission, administrative arbiter of the spaceways, thought twice before they tangled in legal battle with explosive Old Fireball.

But one young man had refused to be overawed by the prestige of

the Kenton name and had given him battle. More than that, he had won—much to Simeon's loud outward lamentation and secret inner delight. Simeon loved a good fight, and here at last was a foeman who seemed worthy of his steel. This very same Kerry Dale had been, not many months before, a subordinate young lawyer in his legal entourage.

"I think I know what you mean," Sally repeated. "You mean that Kerry Dale has turned down your proposition."

Old Simeon glared at her and waved the offending spacegram so violently it ripped in his fingers. "I offered to take him back into my service as a lawyer," he shouted. "I offered to forget that dirty trick he pulled on me about the colliding asteroids which cost me over a hundred thousand. I even hinted that within a year or so he might succeed that dithering ass, Roger Horn, as Chief of my Legal Department. I mentioned delicately I'd tear up that contract he had signed when drunk obligating him to eight more months of cargo-toting on my ships."

"Which was very sweet of you, Dad," murmured Sally, "considering that the said Mr. Dale has already wangled a general release out of you."

"Don't interrupt, child!" snapped her father. He returned to his grievance—the torn, fluttering spacegram in his hand. "Yet what do you think he had the didgosted effrontery to reply."

"I have a faint idea; but tell me, anyway."

"He says—confound him—he doesn't want a job. With me, or with anyone else. He's doing quite well on his own; and he expects to do even better. However, if I'd be willing to associate with him as an equal partner in some ventures he

has in mind, he might consider me."

Old Simeon paused for breath. His blue eyes glared with baleful incongruity in the mild-mannered frame of his visage. "Me!" he choked. "Me, Simeon Kenton, being offered an equal partnership by a babe in arms, a puling young whelp!" His very beard seemed to quiver and grow electric at the enormity of the thought.

Then, suddenly he stopped and grinned. It was an impish, waggish grin that transformed his mobile countenance into a sunny burst. "Not at least," he amended, "until I've licked him and taken him down a peg or two."

"That might take a long time," Sally pointed out. "He won the first round over you, and he might just as well take the second and the third. I think, dad, his proposition isn't such a bad idea at that."

SALLY didn't tell her storm-tossed parent that she had already sent a spacegram to the subject of their debate congratulating him on his victory over the mighty Simeon. They had met only once, and then under rather untoward circumstances. To be exact, it was at the very moment that Kerry Dale was being fired by her father, or was resigning in hot dudgeon—the truth of the matter seemed to depend on who was telling the story. Sally had decided then and there that all the other eligible young men who danced constant attendance on her meant less than nothing. Though young Dale had seemingly not even given her a second glance, that didn't matter. He *would*, she was determined, and that in the very near future.

"Not a bad idea?" yelled Simeon. "It's a superlatively atrocious idea! Har-rumph! I grant you he knows law, but he's still a young snipper-

whipper. Just because he took advantage of some obscure sections of a coff-eaten mode—I mean a mode-eaten coff—oh, ding it, you know what I mean—to steal my hard-earned money from me is no reason for this new foundconded impudence of his. Partner! Bah! And bah again!"

"And triple bah!" agreed Sally. "Nevertheless, suppose this same impudent young man decides to take his proposition, whatever it is, to Jericho Foote? You know Jericho. He'll very likely take him up on it, just to annoy you."

Now the name of Jericho Foote, President of Mammoth Exploitations, was like a red undershirt to a bull, or a cobra to a mongoose. Mammoth was Kenton's chief competitor along the spaceways. They fought for cargoes and trade routes and asteroids. Old Simeon, for all his spluttering and tough fiber, fought fairly and squarely; whereas Foote was devious and subterranean in his ways. He never met his explosive competitor in forthright, honest fashion; he never met anyone or anything that way. Dark and skulking methods were his particular delight; and the darker they were and the more they skulked, the better.

"That rubble-dyed Venusian swamp snake!" said Simeon incredulously. "*He* take up with Kerry Dale? Impossible! Dale is too—"

"Sensible?" Sally finished for him. "That is just what I've been saying. But if you turn him down—"

Her father calmed suddenly. "You love him, don't you?"

"Yes," she said. Being her father's daughter she never evaded an issue. "And I expect to marry him some day, whether he knows it now or not."

Looking at her, old Simeon could

well believe it. No young man could long resist his slim, calm-eyed young daughter. He went to her and kissed her. His voice softened. "He's got the right stuff in him, Sally, in spite of his whangdoodled brashness. But his head's liable to grow too big for him if he gets what he wants too easily. Let him fight the hard way for success; the way I did. Let him fight me, if necessary; it will do him good. And I'll fight him back, tooth and nail. If he wins through, I want him to win on his own, and not because his future father-in-law made the way easy."

Sally nodded thoughtfully. Then a gay smile made a sunburst of her countenance. "All right, Dad. Go ahead and get in your dirtiest licks. But don't mind if I root for the other side."

"I won't." He flicked the telecaster into life. He scowled at the communications operator. "Take a spacegram," he roared. "Addressed to Kerry Dale, Planets, Vesta. 'Your impudent proposition doesn't even merit turning down. My own offer withdrawn. Sent merely out of pity. Wash my hands of you. Expect presently to wash my hands with you. Kenton.'"

"There, that will hold him. Now we'll see what stuff he's made of." He turned grinning toward his daughter. But Sally was no longer there. She had slipped silently out of the office.

A frown replaced the grin. The bluster died. No longer was he master of men; only an anxious parent. He shook his head; screwed up his face in thought.

He returned to the telecaster, and connected with the Earth-Mars Navigation offices. The clerk recognized him. "Good morning, Mr. Kenton," he said obsequiously. "What may we do for you?"

"When's the next ship leaving for Planets?"

"This evening, sir, at 9:45. The *Erebus* blasts off from Cradle No. 4, sir."

"Good. Make one reservation for me. Under the name of John Carter. I don't want my presence on board known."

"Of course. We'll be most happy to take care of it for you. You wish Suite A, naturally, sir. It's the very best—"

But he was talking to a blank screen.

THE *Erebus* was the luxury liner of the spaceways. One thousand feet long it was, its hardened dural hull gleaming like silver in the powerful floodlights. Its equipment was the last word and its appointments luxurious. It carried first-class passengers only and express packages of small bulk but high value.

The usual crowd of loungers, friends and relatives gathered on the brightly illuminated rocket field to see the *Erebus* off. The last warning signal had been given. The visitors trooped down the swaying gangplank over the open struts of the cradle in which the mighty ship pointed its nose slantingly toward the stars. People waved outside. The passengers stood within the observation deck, securely quartzed in, waving back.

Then the protective shields whirled into place, cutting off sight for the blast-off. The field crew moved toward the gangplank, ready to swing it away.

A small aërocab shot like a bat out of hell across the field, thrust out landing gear and scattered the crowd headlong before its slithering stop. The car hadn't come to a halt before the cabby had flung to the ground, snatched at a single lightweight bag

with one hand and swung at the door with the other. But his passenger, a girl with wind-blown locks and hasty traveling costume, had already sprung lightly out.

"Yell for them to hold it," she cried impatiently. "Don't worry about me."

The crowd growled, resentful of narrow escape. "Who the hell does she think she is?" squeaked a burly roustabout. "Almost running us down like we were—"

"Hold the ship!" bellowed the cabby. "Miss Kenton's coming on board."

The ground crew had the gang-plank swinging wide. The foreman jumped at the name as if he had been blasted. He bellowed in turn. The long steel slant jerked, moved back into place. The growls of the crowd gave way to straining of necks, excited comments. The roustabout stopped in midflight, gulped and retreated hastily into the protective anonymity of his fellows.

But Sally was too used to gapings and respectful murmurs to pay any attention. She was running with lithe swiftness toward the ship; the cabby puffing behind her.

"We didn't know," apologized the foreman hastily.

She favored him with a quick smile. "Neither did I," she told him and vanished within the reopened port.

The foreman was dazzled. The girl had gone, but the smile remained with him, to be treasured and brought out again and again for inspection. He even foolishly boasted of it to his stout, work-roughened wife that night while swallowing a midnight meal. And regretted it for days thereafter. For his wife had a jealous heart and a blistering tongue; and she brooked no rivals.

THE HARRIED and obsequious purser was having a rough time of it.

"If we had only known you were taking passage," he wailed, "I would without question have reserved Suite A for you, Miss Kenton. But you see—"

Sally stamped a trim, determined foot. She pretended indignation. "I don't see. Why, pray, may I not have Suite A?"

"It's already occupied. It was reserved only this morning. By a Mr. John Carter."

"And who the devil is this Mr. Carter that he rates the only decent suite on board this ship?"

The purser thought unhappily of the really luxurious quarters he had shown this imperious young lady and which she had turned down. He didn't realize that under her indignant-seeming exterior she was enjoying herself hugely. Unknown to old Simeon, she had returned to his private office while he was packing, and found the telautotyped plate of her father's reservation under the name of Carter. It took her ten seconds then to make up her mind to board the same ship to Vesta; it took her rather more time to throw a sufficiency of clothes together in a bag.

"I don't know who he is," confessed the purser, "but he seems a most irascible old man. Almost blasted me out of the room when I stopped in very courteously to ask him if he required anything."

Sally smiled at this unflattering description of her father; hastily shifted the smile to a frozen stare.

"Then get him out. Give him another room—five other rooms, for all I care. I want Suite A."

The purser was desolate. "I'd be glad to do anything in my power, but you haven't seen this man. He'd

bite my head off if I asked him anything like that. And, after all, the Space Code says specifically—"

"Bother the Space Code! If you're so frightened of this fellow, I'll speak to him myself. Take me to him."

The automatic elevator dropped them to Deck 3; the moving catwalk sped them toward Suite A. The purser surreptitiously wiped his brow. These rich dames, who thought they owned the Universe!

His discreet buzz was answered by a blast from the annunciator.

"Come in!"

The annunciator distorted the voice, but it couldn't mask the impatient rasp to it. The purser shut his eyes and muttered a hasty prayer. There'd be sparks flying when these two met. He wished himself anywhere else but at this particular spot.

The door whirled open; and they stepped in.

It was a beautiful suite; there was no question of that. The walls were photomuraled on receptive metal to give the effect of smiling fields back-dropped by snow-capped mountains. The ceiling appeared an open sky in which glowed innumerable worlds. Couches nestled around a central bath of artificial flame. Open doors disclosed twin bedrooms and a bathing pool filled with activated waters.

A man's back bent away from them. He was seeking a book in the recessed shelves.

"Can't I get peace and quiet even out in space?" he grumbled. "What the devil do you want now?"

"I want this suite," said Sally in a throaty, altered voice. "And I want it in a hurry. I'll give you exactly five minutes to pack and get out."

The purser was horrified. "Now please—" he started in protest.

But the man had jerked erect and pivoted on them. He was furious. His wispy white hair bristled with electric anger. "Give me five minutes! Why, you impertinent—"

His jaw dropped ludicrously. "Sally!" he shouted. "In the name of all the blink-eyed comets, what are you doing here?"

She kissed him. "Suppose I ask you the same question? You know you're subject to vertigo."

The purser's eyes goggled. Simeon Kenton! Old Fireball himself. Father and daughter. He fled before this strange, incomprehensible pair could turn on him.

"Don't be silly," old Simeon said indignantly. "You can't get vertigo in space. Everything's up."

Sally shook her finger at him. "No evasions, please."

He cleared his throat. "Har-rumph! I'm going to Planets. A business deal, my dear. Something that came up suddenly."

"A business deal?" she echoed meaningfully. "Now confess!"

"Yes, a business deal!" he returned heatedly. "And furthermore—" He stopped short. He glared. "Never mind about me. What the ding-ding about you?"

She patted his cheek. "I'm on the same business deal that you are, most reverend parent. Only I bet I thought of it first."

Then the humor of it struck them simultaneously, and they laughed until the tears came and their voices were weak.

"We're both dadgusted fools," cried Simeon. "Only I'm the older one. Very well, I'll talk to that uppity snapperwhipper. But first I'm going to take all his ill-gotten gains away from him. He needs taking down a peg; otherwise you'll find there'll be no living with him."

"I still bet on him, Dad. I have

an idea he won't be so easy to take down."

"That remains to be seen," Simeon said grimly. "The first time he just caught me off guard."

Sally pressed the buzzer. The purser appeared, haggard, defeated.

"Move my bag in here," she ordered. "Into the bedchamber next the pool."

"Y-yes, Miss Kenton. Y-yes, Mr. Kenton. I didn't know—"

"And why didn't you know?" yelled Simeon. But the purser had fled again.

THEY DIDN'T FIND Kerry Dale at Planets. In the twelve days of their journey to that roaring boomtown on the edge of the Asteroid Belt the bird had flown the coop. Flustered officials scurried to bring the mighty Simeon Kenton information.

"Young Kerry Dale? Yes, sir, he blasted off four Earth-days before. In what? Why . . . uh . . . seems like the young fellow had bought himself an old tramp freighter and fitted it out for salvage operations. Had incorporated himself, in fact, under the laws of Vesta. Mighty flexible and generous, the Vestan corporation laws, sir. Nothing like those of Earth and Mars. Initial fees nominal, sir, and the taxes are practically nothing." The official permitted himself a respectful wink. "We don't believe in pestering business. Nothing paternal about us—ha, ha. If Mr. Kenton would care to look at the advantages of transferring legal title to Vesta, we'd be most happy to discuss—"

"Stop your infernal chattering," roared Simeon. "I don't give a tail-ringed hoot about your silly laws. I'm asking simple questions and I want simple answers."

"Y-yes, sir," stammered the frightened official. Old Fireball certainly

lived up to his reputation.

"Where did he go to?"

The records came out tremblingly. Long nose buried into the documents, lifted. "N-no destination, sir. Just cruising through the Asteroid Belt. Under the articles of incorporation, Space Salvage, Inc., does not have to file the port of call of its vessel at the time of blasting off. Hm-m-m! A very peculiar charter, sir. There are lots of clauses in it I've never seen before. We're pretty free and easy about those things, but not *that* much. I'm surprised our laws experts passed it."

"You don't know Mr. Kerry Dale," smiled Sally.

The Kentons went back to their hotel—the single good one in the rushing, roaring, inclosed city of Planets.

"Har-rumph!" observed old Simeon. "We seem to have come on a wild-goose chase. Salvage, indeed? Piracy, more likely. He'll starve to death trying to find salvage work from here to Jupiter. There ain't many ships out and most o' them's mine. And *my* captains just don't let their ships break down. They know better. Oh, well, a fool and his ill-gotten gains're soon parted. We might as well go home, child."

Sally's eyes felt queer and blurry. What was the matter with her? Here she was acting like any silly schoolgirl; literally throwing herself at the head of a young man whom she had seen only once and who didn't care a hoot about her. She had sent him a spacegram and he hadn't even had the decency to acknowledge it. She had tossed decorum to the winds of space and rocketed to Planets and he was gone. Her father was right! He was a fool; an egoistic, self-centered fool. She'd show him! She'd go right back and forget—



"We were on survey—they came down with weapons. They had us cold, and we had to give up—"

"I'm staying here, Dad," she said aloud, miserably aware of her illogic.

"You're a rubble-dyed idiot, daughter," snorted Simeon. "And if you want to make a blasted show of yourself, go ahead. As for me, I'm going—"

They were moving across the soft-padded lobby of the hotel. A man was registering at the scanning booth. The scanner registered his picture and other pertinent data and transferred it to the photoelectric cells guarding the panel of the room to which he had been assigned.

He turned as they came up. His eyes wavered on the Kentons, smiled palely and slid past them.

Simeon stopped short. "Jericho Foote!"

Explosive contempt seared his voice. "What the devil is a slimy Venusian swamp snake like yourself doing out here in Planets?"

Jericho Foote, President of Mammoth Exploitations and old Simeon's chief rival, blinked at him sideways. He never looked any man straight in the face. His black hair was smoothed sleekly over a low forehead. His nose was pinched and brief, his lips bloodless and thin. His smile went underground and his face darkened.

"Some day I'll have the law on you for your slanderous tongue, Kenton," he scowled.

"Run to the law and be damned! I asked you a question."

"It's none of your business," snapped Foote and went hastily past them.

Sally stared thoughtfully after him. "He must have come on the *Erebus* with us. In secret, too. His name wasn't on the passenger list and he kept to his quarters. Oh, Dad; maybe my hunch was right. Maybe when you turned Kerry Dale

down he teamed up with Foote."

"Then he teamed up with a skulking leohippus," growled Simeon. He began to walk quickly toward the scanning booth.

"What are you going to do?"

"Har-rumph! Register, of course. When skullduggery's afoot, Simeon Kenton's not the man to run away. Come on, Sally."

THE MISNAMED *Flash* rolled and wallowed in space and made loud, complaining noises every time the rockets jetted. It was a tub, rusty and dingy with long years of service, and the odors of suspicious freights clung to the interior in spite of thorough scrubblings. The tubes were out of line and gave a wabbling motion. The struts quivered and groaned. The motors pounded and clanked unceasingly. The heavens gyrated in sympathy and danced little, erratic jigs every time Kerry Dale glued his eyes to the observation telescope.

Yet he was inordinately proud of his craft; as proud as if she had been a swift, sleek racer capable of a thousand miles a second. He owned her—every rusted bolt of her; every squeak and rattle. He was no longer a penniless young lawyer out of a job; he was a man with vested property rights; President and total Board of Directors of Space Salvage, Inc. True, he had sunk practically every cent he had in this old scow, and business so far had been exactly nil. That didn't matter. Something was bound to turn up. His nimble wits would see to that. Good Lord—the Asteroid Belt was full of opportunities. If it wouldn't be one thing, it would be another. He had drawn his charter with infinite care. There were dozens of vague, rambling clauses in it that had meant nothing to the law ex-

perts of the Vestan Filing Bureau; but which in a pinch could cover practically any contingency. He could conduct salvage operations, own and operate mines, take title to stray asteroids, barter, trade with and sell to any natives he might find on the several planets and satellites, and in general, as he had thoughtfully inserted, "do any and all things which a natural person might do, not contrary to law."

Which, as Jem admiringly observed, practically gave Kerry the right to commit murder—in his corporate entity, of course.

Jem was his second in command. He had a last name—it appeared on articulated indentures, on certain police records scattered over space—but none of his intimates knew what it was. Everyone called him Jem and nothing else. When Kerry had quit his menial labors as cargo wrestler on the *Flying Meteor*, a Kenton freighter, because of a certain general release he had cannily extracted from Old Fireball, Jem, who had been his foreman and superior, had quit with him. Even in the hold of the *Flying Meteor* Jem had humbly admitted Kerry's superiority, and he had jumped at the chance to throw in his fortunes with the brilliant, resourceful young lawyer.

Right now, however, Jem was a bit doubtful of the wisdom of his course. He had dropped a good job, with a steady, assured income and prospects of promotion, for a hare-brained, crazy adventure. He wasn't accustomed to spaceships that rolled as though they were old-fashioned watercraft plunging through stormy seas. It made him space-sick. And every time the rusted plates squeaked and complained, he looked involuntarily around for the nearest safety boat.

"Besides," he told Kerry, con-

tinuing his growling monologue, "where're we getting at? Nowhere, says I." He stared resentfully out at the wobbly heavens. "We've scooted out o' the reg'lar lanes o' the Asteroid Belt. We ain't even head-in' toward Jupeeter. If you could hold this blamed tub steady for half a minute, you'd see Jupeeter way the hell an' gone over to the right."

"Right!" Kerry agreed cheerfully. "If we're looking for salvage, we've got to keep away from the regular space lanes. The big outfits have their own patrol boats there. Kenton and Mammoth and Interworld and the rest. There're no pickings for us in there. But out here, if a ship gets into trouble, it would take weeks to raise up help, and that's where we come in."

"Yeah!" grumbled Jem, squinting at the solitudes that surrounded them outside the glassite observation post. "If there was a ship, and if she was in trouble. We ain't seen or raised another boat in these God-forsaken wastes for over a week."

The *Flash* shifted course and drove forward like a slightly indecisive corkscrew. The starboard rockets thundered and drew protesting cries from the very bowels of the craft. Jem winced and a terrible thought grew on him. "Say-y-y! That there thing works both ways."

"What do you mean?"

"About this here salvage business. S'pose we bust down. And I ain't saying it ain't mighty likely. Who's gonna save us?"

Kerry grinned. "Let's not worry about that until it happens. The *Flash* is fundamentally sound. Underneath her rust and creaky joints she's got a heart of gold. She'll outlive a hundred fancier, shinier ships."

BUT as the *Flash* drove on and on, far beyond the usual lanes, Kerry be-

gan to grow anxious. The hurtling, crisscrossing asteroids became fewer and fewer. Mars was a tiny point of light behind and Jupiter itself lost magnitude on the right. They were driving at an angle of sixty degrees to that giant planet. Space infolded them, huge, unfathomable, frightening.

Sparks sat patiently at the open visorscreen, waiting for messages that never came. The limited range of their apparatus forbade the reception of signals from the distant traveled courses; and not even a stutter came in from the fifty-million-mile radius of effective reach. They had this sector of space, seemingly, all to themselves.

For the hundredth time Kerry took out a well-thumbed sheaf of three spacegrams, reread them. He always read them in the same order. It was a bit of a ritual.

The first was the offer from Simeon Kenton to rehire him, with the tempting bait of eventual Chief of Legal Department hinted at. It was a most satisfying spacegram, even though he had turned down the offer. So Old Fireball, who hadn't even known of his existence while he had slaved loyally as an obscure member of the legal staff of Kenton Space Enterprises, now was sufficiently aware of his worth to make him a flattering proposal. And all because he had hornswoggled the old man with his tricky knowledge of the law.

The second spacegram was also from old Simeon. This was the yelping insult to his own refusal. He grinned over it. He could read the wounded, incredulous vanity under the violent phrases. The man of power had called him impudent. Well, he *had* been impudent. Deliberately so. The memory of that year of unrewarded toil still rankled, and the cavalier treatment he had

received when he had asked for a raise. He'd never be subordinate again; to Kenton or to anyone else. They'd treat him as an equal or he'd go on his own. And he preferred to be on his own. A lone wolf, pitting his wits and skill against the men of power and money. They had sought to use his wits and skill at law for their own benefit. They had thought to suck him dry and then cast him aside. Well, he'd show them. He'd—

He paused over the third spacegram. Slowly he read it, though he knew every letter of it by heart. "Kerry Dale, Planets, Vesta," it read. "Congratulations. Keep up the good work!" And the signature was Sally Kenton!

He remembered only too clearly the stupefaction with which he had received it. He had just mulcted her father out of a cool hundred thousand. The ordinary daughter would have been furious at the man who had done it. He had met her only once, and then they hadn't spoken to each other. He had been too busy shaking her father and telling him things. He hadn't even known she was Sally Kenton, the toast of two worlds and the darling of the broadcasters.

Yet she had sent him this extraordinary congratulation. Why? His heart gave a great bound—and subsided. He became angry with himself. He was a fool to believe she meant it; that she had a certain personal interest in him. How could she? There was something else behind it. Something devious; something to her father's interest. Well, if they thought they could overreach him, they were both mightily mistaken.

Nevertheless he placed that particular spacegram very gently back in his pocket, taking care not to

crease or dirty it in any way.

He went down into the radio room. Jem was lounging there, looking glum, talking to Sparks. All radio men ran to a pattern. They were slight and wiry and dried-out and birdlike in the brightness of their eyes and the quickness of their movements. This particular Sparks was no exception.

"How're they coming?" Kerry greeted.

SPARKS shook his head with rapid denial. "Nary a thing, Mr. Dale. Not even a code message from some lovesick matey to the gal he left behind in every port o' call. Not a whisper. If I didn't check the tubes regular, I'd think the blamed machine was out o' kilter."

"I say we oughta turn back," declared Jem vehemently. "This here salvage business ain't what it's cracked up to be."

"Maybe not," agreed Kerry. "But I was thinking of other fish to fry."

"What?" they chorused.

Kerry hesitated. "Well, I had wanted to keep the idea to myself until something turned up." He grinned wryly. "But nothing's turned up, so it doesn't matter now."

"Ain't even turned up a space mirage," grunted Jem.

"The regular asteroid lanes are pretty well covered by now," explained Kerry. "Even bits of debris not more than a few yards in diameter are staked out, filed and exploited. The first space rush is over. The original prospectors are drinking away their gains or they're dead; the big outfits moved in and took them over and put exploration on a systematic, fine-comb basis. But this patch of space hasn't been gone over much. I thought perhaps we'd run into a find. Something like that nickel-iron asteroid that brought

Kenton almost six millions in cash."

"So that's it, huh?" snorted Jem disgustedly. "We come out here wild-goosing for treasure. That's even wuss than hunting for distressed ships to salvage where there ain't no ships. Sometimes a boat *does* go off course and gets into trouble. But y'oughta knowed there ain't any asteroids out in this part o' space. There's the reg'lar belt and there's the Trojan belt way the hell an' gone off to one side, what belongs to Jupeeter. But this here place where we're now ain't neither one nor tother."

"So I'm finding out," Kerry admitted. He shrugged his shoulders. "Well, I can't be blamed for trying. Especially when I got word there was a Kenton ship nosing around these parts looking for the same thing I was."

"What?" they both yelled. "A Kenton ship?"

"How d'you know?" demanded Sparks. "They keep those exploration boats pretty quiet."

"Oh," said Kerry airily, "a few drinks of *pulla* back on Planets and a second mate who'd never drunk it before. Just before he passed out he said something about blasting off the next day under sealed orders. Seems a half-crazed prospector had been picked up in midspace by a Kenton ship. He died before they came in to port and the captain screened Old Fireball for orders. When Kenton heard what the ravings had been about, he told the captain to dump the body into space and keep quiet."

"The old man's still on his toes." Jem's tone was admiring. "He don't let nothing slip by."

Kerry said dismally, "I gave them a day's start, thinking I could keep them in sight. But they were speedier than I thought. Oh, well, it

doesn't matter. I suppose they didn't find anything, either. They must have turned back."

"Like we should."

"Might as well, Jem. We're beginning to run short on fuel and provisions. Better tell the engineer—"

"Hey, what's that?" yelled Sparks suddenly.

A faint wisp of sound wavered from the open screen; and a pale shadow danced like a quaking aspen over the white expanse.

"It's a message," cried Kerry excitedly. "Step up the power."

SPARKS stepped up the power, but neither sound nor shadow gained in clarity.

"Hell!" said Sparks, disgusted. "It's a private wave length. Nothing for us."

"That's what *you* think," retorted Kerry. "Can't you get on that length?"

"I could; but I ain't."

"Why not?"

"It's against the law to listen in on private lengths. Says so in the regulations. I got 'em right here."

"Suppose as owner I order you to."

"Still wouldn't do it, Mr. Dale," Sparks answered doggedly. "It'd be worth my license. And besides, I don't aim to go breaking no laws."

Kerry grinned approval. "Good for you, Sparks. Glad to hear you talk that way. As a lawyer I don't believe in breaking laws. But there's no law against interpreting the law so it swings to your side."

"The rule about listening in is plain's can be," insisted Sparks. "There never was no getting round it."

"Oh, no? On the 6th day of November, 2273, Chief Justice Clark, sitting in the Supreme Court of Judicature for the Planetary District of

the Moon, handed down a unanimous decision in the case of Berry, plaintiff-appellee, versus Opp, defendant-appellant, covering an exactly similar situation.

"The law," he wrote, "is not an inelastic instrument. It may be stretched on occasion to mete out substantial justice in cases where the march of time or the failure of the legislature to provide for all contingencies has vitiated the plain intent of the specific provisions. The appeal in the instant case comes within the broad equities of such interpretation. It is true that Section 348 of the Space Code is specific in its wording and provides for no exceptions. But it must be asked, what was the intent of the Interplanetary Commission? Obviously to safeguard individuals and corporations from any encroachment on the right of privacy. A private wave length, officially registered, is as much a private right, to be held free from interference, as any primitive telephone wire or stamped and sealed letter."

Kerry took a breath and plunged on while his audience of two just goggled.

"Nevertheless," he continued quoting, "consider the facts. The appellee's ship was in distress on the Earth-Moon run. A leak had developed. It was losing air fast. The ship operator sent out a signal of distress. The operator, in his excitement, sent it on the private length assigned to the appellee, instead of on the standard wave. The defendant-appellant, also on the Earth-Moon run, noted through his telescope the erratic course of the appellee's ship. He heard the faint buzz of the private message. Assuming that an emergency had arisen, and acting in good faith, he tuned in on the private length. He heard the call for help and hurried

to the rescue. He saved the ship and saved its crew from death by asphyxiation.

"Now the plaintiff, in defiance of all gratitude, sues the defendant for infringement of Section 348. Judicial notice may be taken by this Court that the purpose of the plaintiff is to offset a pending claim for salvage on the part of the defendant. The plaintiff does not come into court with clean hands. The Legislative never intended this section to cover such a manifest perversion of justice. It is plain that the question of good faith must be involved. The defendant acted in good faith. The judgment of the lower Court in favor of the plaintiff-appellee must accordingly be reversed, and judgment rendered for the defendant-appellant, and costs assessed in his favor in the lower Court and on appeal."

Kerry took another breath. "You will find the decision reported in the *Interplanetary Reporter*, Volume 991, Pages 462 to 478 inclusive."

Sparks gulped. "You ain't ribbing me, sir?"

"If Mr. Dale tells it to you," Jem said severely, "it's so, down to the last dotting o' the i's."

"But . . . but I ain't never heard o' that," Sparks still protested, "and according to what you say, that there judge wrote that more'n a hundred years ago."

"Sure it's an old case, and of course you never heard of it. Even among lawyers very few have. The precise matter just never happened to come up again. But it's there, and it's law. It's never been overruled."

Sparks shook his head. "I still don't see—"

"The whole point is one of good faith. We hear a call out in the veritable wilds of space. There shouldn't even be a ship out here.

Suppose, say we, that ship's in trouble. Suppose the operator lost his head, the same as the fellow did in that old case of Berry versus Opp. We listen in, just to make sure. All in good faith. After we've heard enough to decide we made a mistake, that he's *not* in trouble, we cut off."

A wide grin split Jem's face. "And meanwhile we can't help it if we heard things. Kerry Dale, you've got a head on your shoulders."

"We-ell!" said Sparks, half convinced.

"Hurry up!" Kerry was getting impatient. "They'll be off the waves before you get around to it."

Five minutes later Sparks was wiping his brow. "Damned if it ain't a distress call," he said huskily. "That's the *Flying Meteor*, Captain Ball commanding"

"Holy cats!" exclaimed Jem. "My old ship! What's Ball doing all the way out here?"

"Our old ship," corrected Kerry. His face wore a thoughtful frown. "Iron Pants Ball doesn't lose his head so easily. He's trying to raise Planets or some other Kenton ship instead of sending out a general call. Why?"

"He ain't even sending on his regular equipment," said Sparks. "He's using an assembled rig. I can tell from the power. Something happened to his sending outfit. Smashed. And he's drifting. Fuel tanks clean. He ain't saying what's happened. Funny!"

"Damn funny!" nodded Kerry. "Well, boys, this is obviously a job for us; even though Ball isn't asking. Have you got his position?"

"Yeah. Shall I contact him and tell him we're coming?"

"No. I want to surprise him."

Jem chuckled. "And what a surprise! He'll be fit to bust when he sees us two."

But Kerry's frown had deepened.

"Get the engineer to shove on full speed ahead, Jem," was all he said.

It took the better part of a day, Earth time, to make the run. The *Flash* was no speed demon, and she complained and whined and muttered vociferously at the treatment she was being accorded. But Kerry kept pushing her grimly. His thoughts he kept to himself.

The *Flying Meteor* had stopped sending. "Used up their emergency batteries," explained Sparks.

Space was quiet, except for the roar of their own tubes. The detectors picked up a small asteroid, too small and too distant as yet for sight in the electro scanners. It seemed about equidistant from the crippled ship and their own. The rest of space was swept clean. Nothing for a hundred million miles.

The *Flying Meteor*, when it hove into sight, was drifting helplessly. Slowly, at less than a mile a second; silent, its hull dim in the faint reflection from a far-off sun.

The *Flash* came up fast. Kerry opened the screen, put through a call.

No answer.

Sparks whistled. "They haven't a drop of juice left. Not even for local reception. I never heard of that happening before. There's something screwy."

But Kerry was already pouring his long legs into a space suit.

"Hurry, Jem," he said. "Get into yours. You and I are going visiting."

More than thirty precious minutes were consumed in maneuvering into position and cutting down speed to get alongside. The magnetic tractors went into action. The two ships drifted together. There was a slight bump, and the plates gripped.

Kerry and Jem clumped into the air chamber, closed the lock behind them, slid open the outer port. Jem tapped out the Space Code signal on the hull of the *Flying Meteor*. For a moment there was no answer.

"I hope they're not dead," he said with sudden anxiety. "They used to be my shipmates. There was—"

Then the taps came. "Stand by! We're opening. Manual power. No juice left."

Helmeted, rubber-sheathed men met other spacesuited individuals. Air whooshed between. Then they were in Captain Ball's quarters, shrugging out of unwieldy outfits, shutting out with swift door-closing the staring, haggard crew.

"I thought my number was up this time," came Ball's muffled voice as he lifted his helmet. "If your ship hadn't providentially come up—" He choked, stared.

"You, Jem! Kerry Dale, you!"

Jem's fingers touched his forehead from long habit. "Yes, sir." Then he grinned. "Sort of a surprise, ain't it, Captain Ball?"

Kerry said: "It's a small Universe, isn't it? You used to be on the Earth-Belt run; and we were fooling around Planets. Yet here we meet almost beyond Jupiter. Luckily for you, as it turns out. We're in the salvage business, you know. Jem and I."

Ball's eyes narrowed. "The coincidence is too damn pat. I've been running into too many coincidences as it is."

"This one happens to be a lucky coincidence, captain." Kerry pointed out. "You do need salvage, don't you?"

Ball grimaced. "Can't help myself. My fine traps are bone-dry, my radio's twisted junk. My emergency batteries smashed. If I hadn't had one stowed away un-

noticed among the medical supplies, I couldn't even have—" He stopped suddenly.

"You were saying?" Kerry murmured.

"Nothing." His face tightened. "If you could let me have four drums of fuel and half a dozen spare batteries, so I can get started toward Planets and raise headquarters there, Kenton Space Enterprises will pay you well."

"You forget," Kerry said softly, "we're in the salvage business; not a refueling station."

"Damn it, man! You'll get your salvage fees. One third of the ship's value, isn't it? Mr. Kenton will pay, and gladly. I'll sign papers. Only give me the stuff—"

"One third of the cargo, too."

"All right. All right. But hurry and—"

So there was nothing of value in the cargo, thought Kerry. Then why this all-fired hurry? He shook his head.

"Sorry, captain. The laws of salvage are funny that way. No towing; no salvage. Read Section 21, Subdivision 6—"

"You're too damn technical. You know as well as I that if I say so, Kenton will back me up, law or no law."

"Still no sale."

Ball scowled. "Blast you, Dale, have it your way then. Haul me back all the way to Planets. Only let me use your radio. I want to notify my base as to what's happened."

"Do you intend to use code, by any chance?" inquired Kerry.

The captain stared. "Naturally."

"Then still no sale. I have a strict rule on board my ship. No private wave lengths or private codes may be used on my instruments." He

winked surreptitiously to Jem. "Haven't I, Jem?"

That worthy looked bewildered. "Huh? Oh, sure . . . sure! Uh . . . our Sparks, he's a funny guy that-away."

"Ball said coldly: "You fellows aren't talking to a blasted landsman. Stop the nonsense and get down to brass tacks. What's your game?"

Kerry was equally cold and crisp. "That works both ways. What's *your* game, Captain Ball?"

"This is ridiculous!"

"Oh, it is, is it? Let me run over a few things with you. The *Flying Meteor* was taken off its regular run and blasted off under sealed orders. I find it adrift in a sector of space where no one ever goes."

"So you followed me, eh?"

Kerry ignored that. He ticked off his points like relentless hammer blows. "I repeat, I find you adrift. Your fuel is gone; your radio smashed. You might possibly have run out of fuel, though you're too good an officer to have permitted that. But you didn't smash your own radio. Someone else did that for you. If it was a hijacker, you'd have made no bones about telling us. Yet you're holding out on us. Why?"

Ball's face did not change so much as a muscle. It was a well-schooled face. "You're crazy!" he said.

Kerry shrugged. "All right, if that's the way you want it." He turned to Jem. "Come on, Jem. Captain Ball obviously doesn't wish for our assistance. Let's get back to the *Flash*. I want to investigate that asteroid that showed up on our detectors, anyway. Since we don't have to tow this tub—"

BALL LOST his impassivity. "You mean you're going to let us drift out here like trapped animals?"

Kerry pretended astonishment. "Isn't that what you wanted? I thought it was, since you refuse to co-operate."

"You win, and be damned to you!" the captain said bitterly. "If there was any chance of getting through, I'd see you in hell first. But I can't let my men die like rats; and furthermore, it doesn't matter, anyway. They've got a good three-day start and they've got a fast ship. Faster than mine; and certainly faster than yours."

"Ah!" said Kerry. "That's better. Now start from the beginning."

Ball took a deep breath. "Well, we *were* hunting for something. On a tip."

"Skip that part," Kerry advised. "I know about it. Did you find it; and what happened then?"

The captain stared. "Damn!" he said with feeling. "And we thought we were very secret about it. That makes two at least who knew."

"The other being—"

"Jericho Foote, the louse! You know—Mammoth Exploitations."

"Ah!" said Kerry again. "I know. The pot's beginning to boil. He followed you, too?"

"Not that swamp snake! He's too cunning to get tangled up directly. He hired an outfit; one of those that's always hanging around the Belt looking for trouble. I didn't know they were following until I located the asteroid. They kept out of range, using their detectors. They had extra-powerful ones."

"That asteroid you were hunting," said Kerry, "wouldn't by the merest chance be the one *I* just picked up in *my* detectors."

Ball glowered. "I suppose so. There isn't another one around this side of Jupiter."

"And there you found what you were after?"

The captain hesitated.

"You might as well tell me. I'm going to take a look-see anyway."

Ball shrugged. "The whole Universe might as well know now. That poor, crazed prospector was right. It isn't a big one—not over five miles across—but she's just loaded with thermatite."

"Thermatite!" Kerry and Jem looked swiftly at each other. "What percentage alloy?"

"No percentage. It's the pure thing. And a vein as thick as a spaceship. There's been nothing like it found in the System. I think this asteroid must have come from outside. The head of a comet, possibly, caught by Jupiter."

Kerry whistled softly. Thermatite was almost pure energy. It would undergo atomic disintegration *without* giving off gamma rays—hence could be used in very cheap, very light portable atomic engines that required no shielding. But what thermatite had so far been discovered was so alloyed with inert materials that the expense of extraction practically made up the difference, and transmuters couldn't afford to make it. A vein of pure thermatite meant a sizable fortune to the discoverer.

"What happened then?"

Dark anger lowered in the captain's face. "We had just staked out our claim when that damned pirate came up. We didn't have a chance. Practically my whole crew was out on the asteroid, unarmed; and they had a torpedo gun trained on us. There wasn't a thing we could do but curse and watch. They erased our monuments, raised their own; took over whatever thermatite we had already mined, emptied our fuel tanks, smashed our radio, and set us adrift."

"The dirty hijackers!" growled

Jem. "They might as well have murdered you all and been done with it."

"Oh, no!" Ball said sarcastically. "They said as soon as they'd filed the claim properly in their names they'd report us adrift and have Kenton send a rescue ship out for us."

"By which time you'd be dead, if they reported you," Kerry said grimly. "This Foote is a rat!"

"That's the layout. That's why I want to use your radio. I want to raise Planets and have them arrested before they file."

Kerry shook his head. "It would be your word against theirs. They would claim you tried to hijack *them*. Besides, my radio has only a fifty-million-mile radius. By the time we'd get that close they'd already have filed."

The captain swore. He managed to concentrate a good deal into a few words. Jem just glowered.

Kerry thought a moment.

"You took enough observations to calculate the asteroid's orbital elements?"

"Naturally. Otherwise how would we be able to find her again; or file on her? It's quite an eccentric orbit, as you'd suspect from finding her all the way out here. I've never run into any quite like it before."

Kerry's eyes gleamed suddenly. "Hm-m-m! Mind if I look at your figures?"

"Damned if I know why you want to waste your time. We ought to get started for Planets right away." Ball's fists clenched. "I want to lay hands on a few people."

"There'll be no delay. Jem, get the tractors hitched up properly for towing. I'll be with you in a few minutes."

It was with reluctance that Ball brought out his charts. But there was nothing he could do about it. Kerry had the whip hand.

Kerry studied the charts in silence, made some rapid calculations. When he finally looked up his face was wiped clean of all emotion.

"I'm going to make you a proposition, Ball."

"What is it?"

"About the salvage. The *Flying Meteor* is a heavy boat as well as an expensive one. Towing her won't do my tractors or my hull any good. It's worth every bit of the salvage money. And that's going to run high. One third of your ship's value, and you know what that amounts to."

The captain grimaced. "What can I do? I'm in a tight spot."

Kerry stared up at the ceiling. "You've lost out on the asteroid. Foote's gang will file, and then assign to him. He's in the clear. He'll show a check in payment and claim his rights as an innocent purchaser for value. Whatever proceeding you might have against the hijackers would be lost against him. You couldn't prove in a court of law that they were his men?"

"N-no," Ball admitted. "I suppose not. I damn well know it, but I couldn't prove it."

"Exactly. And by the time we get back, they'll have vanished. There're plenty of hide-outs among the asteroids where they can hole up until the storm blows over."

"What are you driving at?"

Kerry met his gaze. "This. I'm going to do you a favor; and Old Fireball, your boss, a favor. Though God knows I have no reason to waste favors on him. I'm going to tow you to port free, gratis, and waive the salvage charges."

Ball came halfway out of his chair. "What?"

"In return for something, naturally. There's got to be consideration for a bargain, you know; otherwise the law holds it to be of no effect."

Ball sank back. "Ha! I see!"

"You don't. All I want is a proper assignment from you, as initial discoverer and authorized agent of Kenton Space Enterprises, Unlimited, of all your right, title and interest in and to the said asteroid, duly described, and of all the appurtenances thereto attached."

Suspicion glared in the captain's eye. "You mean you want to take an assignment of something that is valueless?"

"I don't say it's wholly valueless," Kerry said carefully. "I don't want to misrepresent. I think I can get a nuisance value out of the claim. I'm a lawyer, you know."

"And a good one, captain," Jem chimed in heartily.

The suspicion died in Ball. He even grinned. This Kerry Dale, smart as he thought he was, was a fool. Giving up substantial salvage for a remote possibility. The law of filing on newly discovered asteroids was definite. Two steps were required. First, setting up the proper monuments on the asteroid. Second, filing the requisite affidavits in the Claims Office of jurisdiction. In this case, Planets. One step alone was not sufficient. Prior monuments meant nothing; the date of filing controlled. Well, if Kerry Dale wanted to take the chance, who was he to stop him! In his mind's eye, Ball could hear old Kenton's approving chuckle. The old man was pretty sore over that last trick Dale had pulled on him.

"O. K.," he said. "Prepare the papers, and I'll sign them."

"After I take a look-see at the asteroid. I want to make sure your . . . uh . . . eyes didn't deceive you about that thermatite."

The captain grunted. "Suspicious, hey? Well, I suppose you're entitled to see for yourself."

THERE WAS no question about the thermatite. The quivering glow of it was visible a thousand miles away. It sparkled and danced with lambent flame along a wide streak in the dull, stony jaggedness of the tiny wanderer of space.

"Satisfied now?" demanded Ball. The sight of that precious vein which was rightfully his by prior discovery embittered him all over again. Some day he'd get those birds!

"Looks all right. We're landing, though."

"Why?"

"To reset your monuments. Filing's no good without them, you know."

Let him have his fun, thought Ball sourly. Nuisance value, my eye! That skunk, Foote, won't pay him a nickel.

The ceremony didn't take long. Four metal stakes were driven deep into the stone, exactly in the niches where Ball's old ones had been ripped out. Then a photograving of claim to title was etched deep within the area bounded by the stakes. Meanwhile, Jem gleefully broke off the evidences left by the highjackers.

"Now," said Kerry, "we'll sign our documents. Here's a waiver of salvage, properly prepared, wherein I agree to tow you into port and to accept in full payment thereof your assignment of rights in this asteroid. Please sign here."

For a moment the captain hesitated. This Kerry Dale was a pretty slick fellow. Did he have something up his sleeve? Hell, how could he?

Sometimes the smartest fellows overreached themselves. With a little smile he signed.

Carefully Kerry folded the assignment, placed it in his pocket. The captain buttoned up *his* agreement with a sigh of satisfaction. "Let's get going," he said.

"Right. We start at once, Captain Ball. If you'll get back into the *Flying Meteor*—"

On the *Flash*, Jem said anxiously: "I didn't want to say nothing, Kerry; but it 'pears to me you done yourself out of some healthy money."

Kerry grinned. "So does Ball. Well, we'll see. Meantime, tell the engineer to pull away." He thrust a paper into Jem's hand. "I've plotted our course. Give these figures to him."

Jem stared at them. He knew something about the elements of space navigation. His face showed stupefaction. "This here ain't the right—" he exclaimed.

Kerry cut him short. "I'm the navigation officer on board, not you. Please follow orders." Then, with a smile, he patted Jem on the back. "Don't worry. I know what I'm doing."

Still bewildered, Jem went obediently below.

The lifting rockets spurted. The *Flash*, hitched firmly to the larger *Flying Meteor*, groaned in every strut. The tiny asteroid fell away. They swung a wide arc in space and moved steadily off. The asteroid dropped out of sight.

Kerry settled himself comfortably to await the expected explosion.

It was not long in coming.

The visorscreen buzzed sharply about an hour later. Kerry grinned. That would be Captain Ball. He had given him a single battery for his emergency rig; enough to establish communication between the two

ships; but not nearly enough to raise anything outside of a few-thousand-miles range.

He opened the screen.

The captain's apoplectic countenance appeared. "Hey, Dale," he shouted, "where the hell are you going?"

"To port, of course. Where else?"

"You're either crazy, or no navigator! I've been watching the way we're heading this last hour. You'll never get to Planets on this course in a million years."

"Who said anything about Planets?"

Ball choked. "Well, I'll be— And where the hell *are* you going?"

"To Ganymede City, Ganymede, Sector of Jupiter. What's wrong with that?"

The captain's face was purple and green. He shook his fist. "What's wrong with that? Nothing, nothing except that I want to go to Planets. If you don't turn at once—"

"What will happen?" Kerry asked softly.

"I'll have the law on you! Simeon Kenton will have the law on you! We'll break you so hard you'll never be able to pick up the pieces. We'll sue you for damages on the contract."

Kerry composed himself into a more comfortable position. "You mean that waiver of salvage I just signed."

"I mean nothing else. You agreed to tow me to Planets."

"Look at it. If you'll find Planets mentioned once in there, I'll not only turn around but pay *you* salvage."

"Huh? Well . . . uh . . . maybe it isn't mentioned. That doesn't mean a thing. Any fool would know that's the port. That's where I came from; that's where *you* came from."

"I agreed to take you to port; and



"An asteroid's an asteroid!" Simeon snapped. "What difference does it make?" Dale grinned. "This one wasn't."

I'm taking you. Maybe you've forgotten, or maybe you never knew, but the Interplanetary Commission itself defined the word 'port' in a decision only about two years ago. It was in connection with a salvage claim. 'Port,' it said, 'in a contract

of salvage, was to be construed as the nearest port of call to the place where the tow was commenced; it being understood, however, that the said point of entry was properly equipped with repair facilities sufficient to put the disabled tow into

spaceworthy condition again. Surely, my dear captain, you don't deny that Ganymede City has proper repair docks? And certainly, if you'd look at your charts, you'd notice that we're a good fifty million miles closer to Ganymede City than to Planets."

Kerry put on a reproachful air. "Why, if I took you anywhere else I'd be guilty of a serious breach of contract; and Mr. Kenton would be perfectly within his rights in suing me."

"Damn your decisions and legal twistings!" Ball roared. "It was understood we were to go to Planets. Who the hell wants to go to Ganymede?"

"I do. I have business there. As for your understanding, I'm sorry you misunderstood. Naturally, if you were so keen on Planets you should have inserted it in the agreement."

Ball shook his fist again. "I'm coming on board—"

"Not on my ship," Kerry answered cheerfully. "My space lock's jammed. I'm afraid I won't be able to fix it until we get to Ganymede. See you there."

He reached over and blanked the screen on the torrent of language that the harassed captain was letting loose.

WITHIN a week they were on Ganymede, port of entry for the Jovian System, and capital of the Sector. Ganymede City was a frontier town, rough and sprawling and alive with adventurers come to seek their fortunes on the outskirts of civilization. But Kerry wasted no time on its sordid delights. He went to the proper officials to transact the business he had in mind, and blasted off for Planets as soon as it

was completed and his supplies were replenished.

Captain Ball, irascible, vowing vengeance, took off a day after him. The first thing he had done, after being released from tow in the city's drydock, was to give orders to buy fuel for his tanks and to repair his radio. His next was to hasten to the police authorities to swear out a warrant against Kerry for breach of contract, kidnaping, forcible detainer and whatever else he could think of.

The police sent for Kerry. He came smilingly and stated his case. He exhibited his waiver; reached back of the official to take down a volume of the Interplanetary Commission's decisions, turned unerringly to the proper page and showed the text to him. The official read, looked impressed, and forthwith dismissed the case.

Ball stalked out, breathing vengeance. He hurried to the office of the Intersystem Communications System and sent off a long, blistering spacegram to Simeon Kenton, Megalon, Earth. He didn't know Simeon was on Planets. Then he rushed back to the drydock and lashed the repair men to a more furious gait.

Out in space, Jem said; "*Whew!* I never saw Captain Ball so mad before. He'll rip the insides of his ship getting to Planets ahead of us."

"Let him." Kerry was quite placid. "*I'm in no hurry.*"

Jem shook his head. He was over his depth. There would be plenty of grief waiting for them on Vesta. Ball was hopping mad; Kenton would be hopping mad; and what Kerry had gotten out of it, he couldn't for the life of him see.

PLANETS rocked with excitement. There hadn't been so much excitement in that usually turbulent town

since a section of the roofed inclosure had broken half a century before and exposed the population to the vacuum of space.

First a rakish craft had come into port, bearing all the marks of a long, fast journey. Tough-looking eggs had disembarked and hurried straight to the Claims Office. Filings were supposed to be confidential; but a clerk told a friend, who in turn told another, and within six hours the whole town buzzed with the discovery of a wandering asteroid worth a couple of dozen millions.

Twelve hours later there was more news. Jericho Foote had filed an assignment of the claim to himself, and the strangers had blasted off hurriedly without bothering to attend to the necessary formalities attending ship departures. The same clerk started this bit of information rolling also.

Jericho Foote met reporters with a modest air. Yes, he *had* purchased the rights to an asteroid. Well, of course, there was supposed to be thermatite on it. How much? Maybe a couple of millions; it was hard to say. Did he know the strangers who had discovered it? No; never saw them before. But they had come to him with the papers authenticating their find, and some samples. The assay showed 97.24 percent purity. They needed money in a hurry, and they offered the asteroid for sale. Why hadn't they gone to Simeon Kenton as well? A twisted smirk gloated on Foote's face. He didn't know; maybe it was because his reputation was better. The reporters took this down and whistled under their breaths. When Old Fireball would hear of this, there would be fireworks. Would Mr. Foote care to tell for publication what he had paid? Why, of course, boys. He

showed them a canceled check, made payable to bearer. The check was for one hundred thousand dollars. He didn't tell them, naturally, that this was the price for highjacking Captain Ball.

When the news hit old Simeon he was stunned. So stunned that for an unprecedented five minutes he lost all flow of language. Sally couldn't understand his reaction. He hadn't told her about the *Flying Meteor's* secret mission; nor that part of his reason for coming to Planets had been to be on the spot for first news of the venture. She herself had wandered around the roaring town, feeling curiously empty and unsatisfied. Several weeks had passed and there had been no report from the salvage ship, *Flash*, nor from its owner-captain. Why she was staying on she didn't know. Yet every time she determined to take ship back to Earth her will gave way and she weakly remained.

"Why, what's the matter, Dad?" she exclaimed anxiously. She was alarmed over her father's sudden, choking, empurpled silence. "Just because that man, Foote, hints his reputation is better than yours is no reason for you to risk apoplexy. Everyone knows—"

Simeon found part of his voice. "It isn't that, Sally," he said hoarsely. "It's about Ball and the *Flying Meteor*."

"What about them?"

He told her then; of the dying prospector and his half-delirious story, of the secret expedition of the *Flying Meteor*. "I can't understand it," he concluded. "That there asteroid to which that louse, Foote, got an assignment is the very same one that Ball went after. And Ball should've been back by now.

There's funny work afoot, and I mean Foote."

How funny the work was, showed up three days later in the form of a long spacegram from Ball on Ganymede City, relayed from Earth. There were two portions to the spacegram, and both of them unsealed all of the explosive possibilities that dwelt under Simeon's mild-seeming exterior.

Even Sally had never heard him go on like this. For a solid half-hour he coruscated and sizzled. His language lifted the temperature of the hotel room by ten degrees. His epithets were triumphs of twisted word compoundings. For five minutes he'd devote himself to the slimy, subterranean, hell-spawned Foote. Then, for five minutes more he'd devote himself with equal expertness to a certain ding-danged, balloon-headed, smart-Alecky young feller by the name of Kerry Dale. Then he'd return to his characterizations of Foote.

Sally knew her father; knew it was no use to try and stop him when he was in this vein. Instead, she read the code spacegram that had touched him off. It spoke for itself. Hot fury assailed her at the first part; puzzlement at the second. It wasn't like Kerry. From what she had seen of the young man he didn't do things out of sheer nastiness. Always he had gained by his tricks. His was a hard, realistic code of ethics; but so was her father's. They each recognized in the other an antagonist worthy of his steel; and secretly they admired and respected each other.

But this stunt of hauling the *Flying Meteor* to Ganymede instead of to Planets and thereby ruining whatever slim chance there might have been of bringing the highjackers to justice didn't make sense. Neither

did his waiver of the substantial salvage fees to take up an assignment of a claim that he surely must have known wasn't worth a cent.

Old Simeon finished with a resounding burst of oratory that started curls of smoke in the cushioned sofa. He picked up his walking stick—a flexible, ornamented bit of duraluminum—shouted to his daughter: "Send a spacegram to Roger Horn to come here right away. Tell him to charter a boat; a whole fleet of boats, if necessary. It's about time that stuffed windbag starts to earn the fees I'm paying him." Then he was gone.

He met Jericho Foote in the hotel lobby, surrounded by reporters, still hot on the scent of the story.

"Oh, oh!" murmured one of them to his fellows. "Here comes Old Fireball and there's that certain look in his eyes. Watch this. It's going to be good."

How good it was going to be even the hardened reporters did not know.

Old Simeon moved swiftly through them, paying no attention as they scattered from his path. Jericho Foote rose to meet him. A slight alarm assailed him, but it passed. After all, there were plenty of witnesses around.

"Well, if it isn't Kenton!" he exclaimed. "You're looking—"

Simeon said nothing. He lashed out swiftly with his cane. It caught Foote on the shoulder. He staggered back, crying out. Simeon followed relentlessly. *Thwack! Swish! Crack!* The cane whistled and sang about Foote's ears, slashed his body, cut down his upflung arm, thumped across his back as he turned to flee. Foote screamed for help, yelled for mercy. But still the cane sang and danced. It was whispered later that the reporters did not interfere until Foote had been soundly and thor-

oughly beaten, and then only because, after all, they didn't want actual murder committed. They didn't like Foote.

Foote was carried to bed and Kenton sallied triumphantly into the street. Foote commenced action against Kenton for fifty thousand dollars for assault and battery with a dangerous weapon and intent of mayhem. Kenton counterclaimed with a demand for one hundred thousand dollars damages for slander and innuendo that his, Kenton's, reputation wasn't all that it might be. Planets rubbed its collective hands and looked forward with glee to a fine summer.

ROGER HORN and Captain Ball arrived almost simultaneously; Horn puffing and gasping from the urgency of his call, the captain burning with desire for revenge against all and sundry.

Horn listened and hemmed and hawed. When the captain was through he looked worried. "Of course . . . hem . . . we have a good cause of action against these . . . haw . . . hijackers; if they can be found."

"To hell with them!" yelled Simeon. "I want you to get that asteroid back and get that Venusian swamp snake, Foote, in the bargain."

Horn cleared his throat. "Well, in the first place," he said judicially, "Captain Ball admits he can't prove in a court of law these . . . hem . . . scoundrels were hired by Foote."

"I can't," Ball growled.

"Therefore, Foote is an . . . ahem . . . innocent purchaser for value, and whatever claim of forcible entry and detainer may be alleged against his . . . ah . . . sellers cannot be imputed to him."

"Dadfoozle it!" shouted Simeon.

"I didn't need *you* to tell me that. Any law apprentice could've told me the same thing. I'm paying you disgusting sums to tell me *how* to get things done, not why it *can't* be done. I'll bet that scaddlewagged Dale would've—"

Horn winced. Damn Dale! He was sick and tired of hearing his name thrown in his false teeth every time. Then he brightened. He put on an air of dignity. "Speaking . . . ahem . . . of this . . . ah . . . young Dale, you lost whatever claim you might have had on the asteroid by assigning your rights to him. I have examined the document, Mr. Kenton, and I assure you it was properly drawn."

Simeon deflated. "Huh? Yeah—I suppose so." Then he, too, brightened. "Anyway, dadburn him! He outsmarted himself this time. Salvage would have amounted to a hundred thousand. Instead, all he's got is a worthless assignment." He turned suddenly on Horn. "You're sure, though, it is worthless?"

"As sure as I am of anything. I'm willing to stake my reputation—"

"Huh!" Old Simeon's snort was plainer than words. "Then how about getting after him for towing Ball to Ganymede?"

"Well . . . hem . . . I'll have to consult my books—"

"You won't have to," Ball said bitterly. "Dale consulted them before he started. He found a decision which permitted him to head for the nearest port, which was Ganymede City. You'll find it, my dear Mr. Horn," he added with biting sarcasm, "in the Decisions of the Interplanetary Commission, Volume 53, Page 209."

"But why did he take you there?" demanded Sally. "He lost by it as well as you. Didn't you say he's on his way here now?"

"Yes; and I don't know, Miss Sally."

Old Simeon regained his elastic good humor. "Just pure spite, my dear," he chuckled. "He found out he'd made a foolish bargain, and he took it out on the captain. After all, losing a hundred thousand in salvage would—"

"By this time, Mr. Kenton, you ought to realize I do nothing out of spite."

THEY all whirled. The door had opened silently.

"Kerry . . . Mr. Dale!" gasped Sally, surprised at the way her heart thumped. "When . . . when did you arrive?"

He looked leaner and fitter even than that single time she had seen him before. Space life agreed with him. He carried himself easily and there was a sureness about his movements and speech.

"About five minutes ago. I took an aërocab to beat the news. And just stick to Kerry. I like that better from your lips, Sally."

Simeon glared at him. "Har-rumph! You have a nerve coming to me after the dirty trick you played."

Kerry became curiously humble. "That's why I came, Mr. Kenton. I felt . . . uh . . . under the circumstances it was no more than right that I make you a proposition."

"I'm not interested in your propositions, dingblast you!"

"Wait till you hear it. I'm willing to give you half of my assigned rights in the asteroid provided you pay me the full salvage on the *Flying Meteor*."

Old Simeon chuckled. He was in high good humor. "You're slipping, son. I'm really disappointed in you. I thought you were a young man

who knew his way about." He shook his head sadly.

Kerry pretended surprise. "I don't understand, sir. Half of that assignment is worth—"

"Exactly nothing. No, son. You were too smart for your own good. You dropped the salvage money and I'm going to hold you to it. A contract is a contract."

"That's your final word?"

"Absolutely. Business is business."

"Good!" Kerry's countenance cleared. "I confess I did feel a little conscience-stricken, but you yourself tell me business is business."

"What do you mean?"

Kerry grinned. "Captain Ball may remember I checked the elements of that little asteroid before I offered to waive the salvage."

"Come to the point."

"The point is simple. Asteroid X is not, as everyone hastily assumed, a member of the Asteroid Belt. It's really a Trojan asteroid, though an unusual one. For, while it fulfills the classic conditions of the Trojan group in that it moves along a stable orbit which is equidistant from both Jupiter and the sun, it lies apart from the ones we have hitherto known—such as Hector, Nestor, Achilles, Agamemnon and the rest. In fact, it swings altogether on the opposite apex of the given equilateral triangle."

"What the ding-ding difference does it make what group it belongs to?" said Simeon impatiently. "An asteroid is an asteroid."

"In one sense, yes; in another, no. The regular asteroids make up an independent system. The Trojans depend wholly on Jupiter. The Trojans, Jupiter and the Sun all together give one of the known special solutions of the three-body problem. The Trojans, in effect, are satellites

of Jupiter. Their orbits would go haywire if Jupiter's influence were ever removed. And that means, my dear sir, that the regional office having jurisdiction over Asteroid X is *not* Planets, on Vesta, as all of you thought—including Foote's pirates—but Ganymede City, which assumes charge of the Jovian System."

They all spoke at once. Sally cried: "I see it all now!" Horn puffed like an ancient engine. Ball said "*Damn!*" with concentrated intensity. And Simeon roared: "*That's* why you dragged my ship all the way to Ganymede, you young snapperwhipper! So you could file that claim you swornhoggled me out of."

"I offered to split with you at bargain rates," Kerry said calmly. "You refused the offer."

"He's right," said Sally. "You did yourself out of a good thing by being too suspicious."

Simeon glared at her; glared at Kerry. Then he threw back his head and laughed until the tears trickled down his wispy beard.

"What's so funny, sir?" snapped Ball.

"That Dale beat me again. But I don't mind it so much thinking of Jericho Foote's face when he hears this. Even in bed he's been gloating. He spent a hundred thousand on his blessed pirates; and all he's got in exchange is a good caning."

THE DOOR swung open again and Foote hobbled in. One arm was in a sling; his face was puffed and swollen; and he required a cane for support.

"Evidently Mr. Foote has already heard the good news," Kerry announced calmly. "I sent him a note as soon as I landed."

"You . . . your tricksters!" screamed Foote. "I'll have the law

on you. My hundred thousand! My asteroid! My arm! You can't get away with this—"

Kerry stepped up to him. His voice was dangerous. "Careful what you say, you old billy goat. You forget I *landed* on the asteroid. Your hirelings were so anxious to get back to you with their plunder that they left a bit of evidence behind. Something that belongs to *you*."

Foote shrank back in alarm. "It . . . it ain't so. They didn't dare . . . I mean, I don't know what you're talking about. Lemme see it!"

"You'll see it fast enough in court," Kerry assured him ominously. "On the very day, in fact, that your case against Mr. Kenton for assault and battery comes to trial."

Foote's face tried to wreath itself into smiles and failed ignominiously. "Heh . . . heh! I was maybe a bit hasty. After all, I'm willing to let bygones be bygones."

"You mean—you'll drop the action?"

"Well . . . that is . . . if—"

"If I don't produce my evidence. O. K.! You sign a discontinuance and release, and I'll promise to keep what I've got out of public hands. But if at any time you—"

"I'll sign!" Foote croaked eagerly.

"I think," said Kerry, "Mr. Horn, as Mr. Kenton's attorney, is capable of drawing such a simple little document."

Horn said pompously: "Young man, I—"

"Sit down and do it without palaver," Simeon rasped.

The lawyer sat down without another word and his pen made slow, dignified movements on a sheet of paper.

Foote snatched it tremblingly

from him, and signed it without even reading the contents. "There!" he quavered. "Now how about that—"

"You have my word." Kerry's voice was awe-inspiring.

"Yes, of course; of course! Well, good day; good day to you all." And Foote hobbled out faster than he had come in.

Simeon cleared his throat. "Har-rumph, young man. I didn't want to interfere, but I think Foote belongs in jail. If your evidence—"

Kerry grinned. "Evidence? Do you think I'd have bargained to withhold evidence of a felony if I had any? I'm a lawyer, sir. I don't compound felonies."

"Then . . . then—"

"Not a scrap did I find. Sheer bluff, sir. And a guilty conscience on the part of the estimable Foote."

"Well, I'll be didgosted!"

Kerry bowed. "There's a bit on my conscience, too. After all, I *did* do you out of a valuable asteroid."

"Don't mention it, son. I'll do the same for you yet. No man ever got the final best of Simon Kenton yet."

"Here's hoping. But in the meantime I still have my conscience." His glance rested on Sally. "If Miss Kenton could be induced to help me spend some of my ill-gotten gains in town this evening, I'd feel I'd made some reparation."

"Being my father's daughter," murmured Sally, "I accept."

THE END.

IN TIMES TO COME

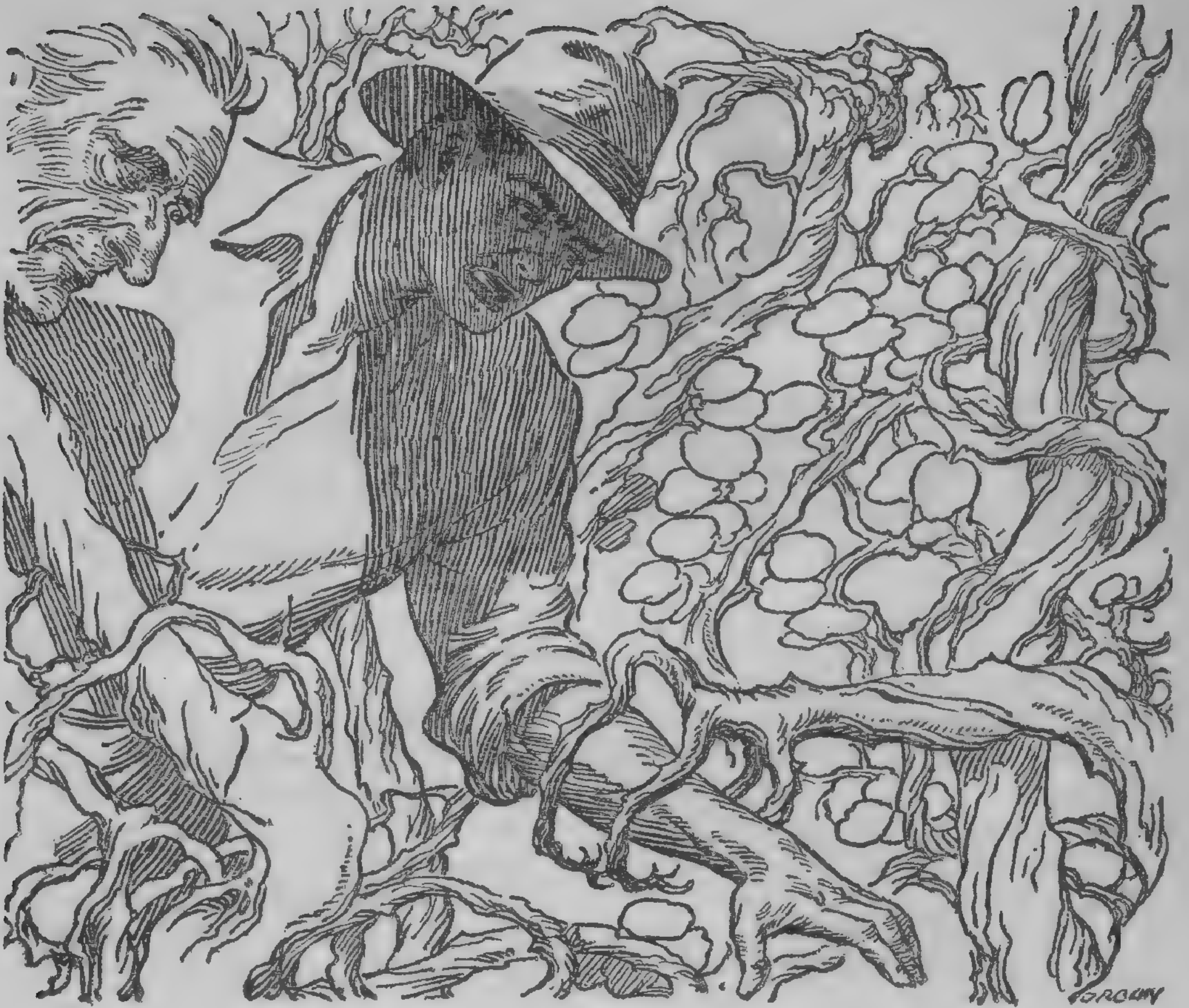
NEXT month, Isaac Asimov has a novelette, "Nightfall," inspired by a quotation from Emerson—which might, offhand, seem a curious source of inspiration for a modern science-fiction writer. Said Emerson: "If the stars appeared but one night in a thousand years, how would men believe and adore, and preserve for many generations the remembrance of the City of God!"

"Nightfall" discusses just that point. How *would* men believe—and what—if the stars appeared but once in a millenium or two? Suppose there were a planet of a multiple-sun system where there was no night, since there was always, everywhere, at least one sun-star in the sky. Except that, once in some twenty-five hundred years, the configuration became such that—night fell.

Now—what would happen? Asimov has an idea, and a story—and I think they're both darned good!

That's for September's cover story. October's, to be discussed more fully, will be "By His Bootstraps," by Robert Heinlein. The November cover story will be Dr. E. E. Smith's newly completed novel, the long-awaited sequel to "Gray Lensman." It's one hundred eighteen thousand words, so it will *not* be complete in the November issue, but probably in four parts. Incidentally, if you didn't read "Gray Lensman," all the four issues containing it are available at Street & Smith's Subscription Department. Now'd be a good time to read—or reread, for that matter—that yarn.

THE EDITOR.



METEOR LEGACY

By Raymond Z. Gallun

**There was a strange sort of seed that rode
the meteor, and under the right conditions,
it produced a stranger sort of—plant!**

Illustrated by Orban

"GLAD you came, Hal Chester," Tom Simms croaked weakly, leaning against the door frame of his adobe desert hut. "Got something to show you that you won't believe, until you see for yourself. About that big meteorite—"

He looked tired and feeble—just

about ready to cash in. I could see that life was nearly done for a friend whose restless, brilliant, and independent thinking I had always admired—even though so much of it had been wasted, while he'd chased rainbows.

Old Tom was a legend with me,

you understand. A gold miner, seventy if a day. He had a brain, though. One that would have put him in a scientist's smock in an important research laboratory somewhere, instead of in ragged dungarees and a battered sombrero—if he'd had the training.

A few years back he'd sold some land he'd claimed long ago to a railroad company. Since then, with the small amount of money he'd received, he'd given his burro and his shovel and his bad heart a rest, while he read technical magazines and built *real* machinery—mostly from junkyard stuff.

But he still chose to live in the Arizona desert, in a region so lonely and desolate that the End of the World could start here without anybody knowing it for weeks.

All through July and August he hadn't shown up at my machine shop in Tucson. So, considering his health, and his solitary habits, I'd got worried. The time he'd told me about finding a huge, ancient meteorite, embedded back of Shadow Hill, a mile from his little mud-brick house, had been the last I'd seen of him.

So, this Saturday afternoon, I'd driven out as far toward his place as the roads would take me. I'd walked the rest of the way, not knowing yet that I was getting tangled with horror.

Feeble though he was, Tom Simms didn't show many signs of his defeated past, now. Over all his stringy body, and in his sly, weary, worried smile, there was a faint suggestion of grotesque triumph, as though, somehow, he'd been tampering with the locked gates of Hell—and had found the combination.

"Well, Hal, let's go take a squint at my pets," he urged darkly. "And

don't look so kind of puzzled. Get a good grip on your nerve. You might need it."

Since my arrival I'd heard the cryptic rattle of machinery in the hot, dusty air. A small gasoline engine and compressor pumps, it sounded like. Tom led the way behind his gray-walled hut. There, sprawled among tall cacti, was a queer sort of mounded structure, with a flat crest. At one end of it, that machinery was working—stuff that Tom had probably made himself, mostly from old car parts.

We climbed the sandy mound by means of a crude stairs of carefully placed stones. Here, from a little platform, I looked down at the structure's level upper surface. The mound was a chamber, roofed with squares of plate glass—maybe obtained from a broken store display window, or cut from old automobile windshields. Each piece was carefully sealed around the edges with putty. Tom Simms had used all his painstaking ingenuity to make everything as perfect as possible.

"I call this my test-tube house," he offered briefly. "The sand piled all around it, is to help keep the desert heat out. The inside walls are tarred, so they won't leak. The bigger part of the air is pumped out of the room inside, by a special pump I made. I built a refrigeration machine, too, to keep the partial vacuum cold."

The purpose of all this work that Tom was telling me about, was still a mystery to me as he spoke. It takes a moment for startling facts to register in one's mind, you understand. But now my eyes and my brain really began to function, pushed by something a lot stronger and more blood-chilling than mild interest.

THE BRILLIANT Arizona sunshine streamed into that rectangular, glass-covered chamber, making everything there plain to be seen. There were brownish, olive-tinted lumps, with a lot of spines glittering on them, like little, silvery slivers. And a lot of vinelike things, massed together. Peculiar roundish thick leaves sprouted from them. Each stem and stalk and leaf was dotted with tiny, glassy, wickedly glittering specks.

At first, as I looked, all those vine-like tendrils were stirring sluggishly, lazily, luxuriously. But all of a sudden this movement stopped—froze to rigidity—as a man or a wild animal might do when surprised by an unexpected and possibly dangerous visitor.

Well, there was no use denying what I saw. A she-cougar with young ones somewhere about, had tried to jump me once on a desert night years ago. But I hadn't felt half as bad, then. These things were plants, all right; but they weren't plants from Earth! That fact was plainer than print! They weren't cacti. They weren't real vines, either. Their brown-green color, with opalescent, prismic hues shifting on it, like an oily water, was entirely alien and unfamiliar. And those dusty plant tentacles had another property, almost unknown among terrestrial vegetation—the power of visible if not swift movement. They had been squirming like snakes before, while now, weirdest and most unplantlike of all, they were stiff and motionless, as if with sudden, doubtful, wary fear, at the sudden appearance of Tom and myself!

Desert sun, or no desert sun, I still have considerable faith in my own observations. I didn't waste time telling my friend that this was all an impossible nightmare. My hide was prickling all over, as I put

an almost obvious two and two together.

"Tom," I rasped, "you mentioned the Shadow Hill meteorite when I arrived. Just how much has it got to do with these pets of yours?"

He shrugged, and showed snaggy teeth in a cryptic grin. "The meteorite is the whole answer, Hal," he said mildly. "Must be a piece of some unknown planet, that maybe belonged to an unknown solar system, way out among the stars. Must have got smashed up in a collision with another world, ages ago. That meteorite was on Earth a long time since it fell, judging from the way the rocks were packed over it when I dug it out. Too big to move, but there was some kind of hard clayey stuff deep in the cracks and holes in the rusty iron that makes up most of it. Soil, Hal; though not quite terrestrial soil. But there were roots in it, and something black that looked like seeds. That clay was awful hard and dry—it could keep things preserved for a terrible long time, Hal—"

I sighed raggedly, as old Tom paused. It wasn't so difficult to fill in a lot of the story that he'd left unsaid.

"You thought perhaps that those seeds could be made to grow, with proper care, Tom," I prompted. "Because the climate and atmosphere of that other world probably wasn't Earthly, you decided that you needed a place where the temperature and air pressure and humidity could be tested and adjusted, until you found the combination that was best suited for the seeds. So you built the test-tube house, where this could be done."

Old Tom nodded. "That's right," he said. "Those seeds came from a dying world, Hal. Where the air was thinning out, and where it was

getting cold. Anyhow, the way it turned out, that's the kind of climate these plants need."

SO FAR, startling though the facts were, I had most of them clear in my mind. But there was a lot more, too. Plenty that made the thought of seeds or spores kept alive in a meteor, that had perhaps drifted for ages from interstellar space before it had reached the Earth, seem simple and commonplace. After all, life is rugged, and the absolute zero of the void should be an excellent agent to preserve things completely intact and changeless. And being embedded deep in clay in the cracks of the meteor, the seeds would not have been exposed to the terrific surface heat of friction, when the thing that bore them had plunged into the Earth's atmosphere.

Yes, there was much more than all this! The way these weird pets of Tom's had stopped squirming, when we had first looked down at them, through the glass roof of their shelter, was deeply significant. It was as though they saw us, and were studying us! Those hundreds of scattered, glassy specks, half hidden beneath the silvery vegetable hairs of stems and leaves—you could hardly escape the thought that they were visual organs of some kind. Eyes. After all, I'd often read that the leaves of even terrestrial vegetation contain crude light-sensitive cells.

"All right, Tom," I mumbled at last. "You couldn't be a liar—though maybe I wish you were. There's something you can't avoid feeling. These plants are intelligent. The way they act lets you know that. Maybe they're as smart as—well—dogs, for instance."

Tom Simms' tired old eyes gave me a you-don't-know-the-half-of-it

stare. "Dogs?" he repeated with a question in his tone. "Huh!" He paused, then he nodded down at the glass roof. "Let's go inside, Hal," he suggested. "There's a lot that you haven't caught onto yet, the way it looks."

I won't kid anyone that I didn't feel real fear just then. I'd hesitate to go into a cage full of hungry lions, and old Tom's invitation struck me as being a still more serious matter. That little test-tube house of his, and its eerie inhabitants, was like a fragment of a nameless world. And the unknown is seldom reassuring.

But cold, thrilling fascination egged me on. Besides, I was tough and big and in the prime of life—and as used to trouble as most people. Certainly I could go anywhere where little, dried-up Tom dared intrude.

We got down from the top of the mounded structure, and went to its end, where that homemade engine was turning the refrigerator compressor and exhaust pump and other machinery.

Low down in the flank of the mound, here, there was a trapdoor, made of wood. It was covered with a thick, sealing coat of tar. And there was rubber packing around its edges, cut from discarded tire inner tubes.

Tom unfastened the bar that held the trap in place, and tugged at the latter's wooden handgrip. The trap came away with a hollow, plopping sound, like the pulling of a cork from a jug. We crept in, through the opening.

We were now in a heavily tarred, boxlike compartment, which evidently had the purpose of an air lock—a means of passing from the normally dense atmosphere outside to the interior of Tom's test-tube

house, without destroying the partial vacuum which existed there.

There was a second trap overhead, but before he opened it, Tom sealed the outer door, and fitted me and himself with goggled masks, made mostly from old tire parts. Long hoses led from them to a double-nozzled valve in the wall.

"We'll need these masks to breathe with, when we go inside," he explained. "The air comes through the hoses from a little pump hooked to the engine."

There was a gasping hiss of equalizing pressures, as he pulled that upper trap free. In the chill thinness we ascended through the square hole above us.

"Take everything easy, Hal," Tom cautioned, his voice faint and far-away through his mask, and through the frosty, rarefied air, that half-muted all sounds, like the atmosphere of a dying planet. "Better stay where you are—"

WONDERINGLY I took everything in, feeling a lot like a lost pup, stranded in an unburned section of woods at the center of a forest fire. The dry sand of the chamber's floor was packed with fibrous roots. Tom had advanced across the room, drawing his air hose behind him. Those dusty tendrils with their glittering eye cells moved a little aside at his passage, as though Tom's weird charges knew him, and recognized him as their friend.

But otherwise the meteor plants were quiet, with what seemed a still, guarded, suspicious tension, full of mistrust, fear, and vengeful calculation, which I felt was directed mostly toward me—an intruder.

Like some aged botanist fussing with rare orchids, Tom Simms muttered crooningly, appearing to have forgotten all about me. But then,

suddenly, he pointed up toward the wall.

"Hal," he said. "There's something I wanted you to see."

I stared at the spot toward which his gnarled index finger was directed. There was a mass of spiny vines there, broadened out into a thick, woody lump, that fitted perfectly into a chink in the heavily tarred stones of the wall.

"There was a small leak, once, in the stonework," Tom explained. "Air from outside was seeping in. I was going to tar up the crevice, but before I got a chance, *they* fixed it. They know, all right, that they're on a strange world. They know that if too much heavy atmosphere got in, they'd smother. They plugged the leak by growing into it, and filling up the hole."

Tom Simms didn't have to say any more than this. Just a few minutes ago I'd said that these plants had intelligence, maybe like that of dogs, in degree. But this little demonstration looked like something quite a ways beyond canine cleverness.

"That's nothing much, Hal," Tom offered quietly. "I'm going to show you a lot more."

He picked up a loose, half-dried leaf, that had fallen from one of his eerie pets. Then he came back toward me, while those monstrous growths seemed to watch, hating me, and afraid of my invasion of their private quarters.

Tom tore the leaf apart. Embedded in its pulpy texture, were fine, whitish threads, and little knobs. "Maybe this is brain and nerve stuff," Tom hinted. "Or maybe I'm nuts to think so. Anyway, you haven't got the whole set-up yet, by any means. We'll have to go outside again, now—"

I was damn glad to be leaving

that sullen place, so full of threats and spacial mysteries. But just as I was getting ready to crawl down through the air-lock box again, something happened. One of those dusty, rainbow-sheened tendrils got in my way. It had groped out sluggishly toward me. Now it touched my bare arm. In that moment of contact I was surprised that it was warm—like animal flesh. I pushed at it impulsively, as if a snake were crawling on me. A few sharp spines went into my fingers, like small thorns. There was juice oozing from them.

Old Tom grinned. "That's happened to me lots of times, Hal," he said. "No real harm in it. But watch your step from now on, and you'd better rub that juice off your hands."

My friend was grinning all right; still I didn't know whether there was a shadow of worried concern in his gray eyes or not.

OUT in the open once more, we returned to the end of the mound structure, where the engine and pumps were throbbing. There were roots poking up through the sand, here. They were shriveled a little, because they weren't made for this strange, hot climate. They had evidently burrowed out from underneath the sealed foundations of the sealed test-tube house. Nourished by the parent growths within, they could continue to live in an Earthly environment.

But it was the way those meteor-plant roots were tangled up with the base of the machinery, that looked really important. They seemed to grope all over it, through oil and engine dirt, as if trying to find out what all this queer Earthly apparatus could be!

There were those same little glint-

ing eye lenses that I had seen before in the test-tube house, dotting those roots; and at the ends of the latter were tiny, suckerlike cups that clung tightly to the metal of the machinery, and oozed a sticky fluid. Around the sucker cups grew tiny whitish filaments. Fine as spider web, they still must have been specially conditioned, somehow, to an Earthly climate, for they did not wilt. And it wasn't hard to imagine that those filaments were sensitive far beyond human touch.

"You see that gooey stuff that comes out of those suckers, Hal?" old Tom whispered. "I tested it. It's a kind of vegetable acid. It eats up metal—dissolves a little of it. And then—well—those little fine threads touch the liquid afterward, as though tasting it, or something. Those threads are so damn fine that you can figger they might be able to feel most anything—maybe even chemical structures. A sort of chemical analysis—"

I might have commented on Tom's weird idea right then—a hint of a science far different from the science we know. But then I noticed something else. Two things, really, that gave me a cold chill of what seemed slowly culminating danger.

There was a little cactus there, growing by the engine. It was an ordinary variety. But a bunch of white threads from those alien roots, had enveloped it in a kind of lace-work that glistened in the sunshine. Some of those filaments had bored right through the cactus' tough shell, as if seeking the soft interior.

But that prickly desert growth was the least interesting of the two captives those meteor-plants had made. The other was a tiny lizard. It was webbed, too, with those pale, spidery strands, and held down so that it couldn't more than squirm,

by stronger root structures. And just as with the cactus, many of those threads had drilled right under the lizard's scales, as if probing its vitals beneath.

Some plants I had heard about were carnivorous, like the Venus fly-trap, for instance. That was what prompted me in my next question.

"What are your pets doing, Tom?" I asked. "Eating that cactus and that lizard?"

Old Tom spread his hands, palms upward, in a gesture of doubt. "Maybe," he responded. "Only both those things have been covered with those threads for days—plenty of time for them to be eaten up, if they were going to be."

"Then what's happening to them?" I stammered. "What else *could* be happening?"

Tom Simms grinned mildly again, the fascination of questioning mysteries in his eyes. "Dunno, Hal," he drawled. "That is—for sure. But I got an idea. What would you do, if you were stranded on some strange planet? Try to find out as much as you could about the things around you, I guess, in order to make a fair fight to stay alive. That's what these meteor plants are doing, I think. Exploring my machinery, to see how it works, if they can. Exploring that cactus and that lizard—maybe to find out how they happen to be—alive. Those pets of mine are smart as hell. They aren't dumb. Smart as we are, or maybe more so. Civilized, too, I wouldn't be surprised. And I got an idea that they know plenty about science, besides."

"Science?" I blurted, remembering what I had thought before. "Tom, you're nuts! How could these plants know about science? Where are their instruments and apparatus and machines?"

Old Tom grimaced tolerantly. "I didn't say that it was the same kind of science as ours, Hal," he offered. "They're—vegetation. Making things out of metal and stone and other materials like that, is probably more than they can do. But see how fine and delicate those root filaments are! How do you know that they aren't a thousand times more sensitive than the most complicated instruments we can devise? How do you know that they don't have senses that we never heard of? How do you know that they can't 'feel' atoms and molecules? How do you know that they haven't a way of finding out what *life* itself is?"

CRAZY OR NOT, that weird thought proved the originality of Tom Simms' mind. It gave me an idea of what kind of a scientist he might have made, if, in his youth, he'd traded his burro and his shovel for a spell in a university lecture hall and lab, sending that restless soul of his along a different orbit.

As it was, that idea he'd given me began to soak into my imagination. And sweat, cold and clammy and nervous, began to soak out—into my shirt.

Meteor plants, from an ancient, shattered world, far, far away, in space. A vegetable civilization, utterly alien, and just dimly comprehensible. And now, here, maybe started again—on Earth! Had these plants perhaps inherited the memories and the knowledge of their ancestors? How far beyond anything a man might understand, did their weird powers go? Theirs was a science that had followed a different course.

It's no fun to destroy anything wonderful. But there was danger here. Hatred. Suspicion. I had sensed these things many minutes

ago. And now my own vague fears seemed to culminate in thoughts of action. No one could really guess to what strange, dread end this miracle that Tom Simms had started might lead, or what subtle means of attack these nameless monsters might use.

"Tom," I said quietly, "there's just one thing for us to do. Pour gasoline on the whole business, here. Burn it up. Quick!"

He nodded. "I thought you'd tell me that, Hal," he said. "But I can't do it. I won't. Not yet, anyhow."

I supposed that it was scientific interest—eagerness to learn more about these mysterious entities—that restrained Tom's urge to destroy. Unless it was something else—something that the meteor plants had already planned and carried out.

"But you'll be all alone here, Tom," I argued quietly. "These things might kill you, some way, for all you know."

He grinned wearily. "Nope, Hal. I don't think so," he said. "If I stopped taking care of these plants, keeping the machinery running and everything, they'd die after a while. I'm sure they realize that. And I can't live long, anyhow. As for danger to other people—well—this is a long ways out in the desert. I guess I can take a chance. Please don't tell anybody, Hal, when you go back to town."

I felt anger rising in me gradually—anger at the stubbornness of this strange, lovable, free-thinking old miner—fury at the vague, threatening enigma he harbored. My right hand felt sore, reminding me of something. In the test-tube house I'd been pricked by the spines of one of those weird tendrils there. And it had felt warm, like animal flesh—as though this bizarre vegetation, native to so frigid a planet, could develop its own heat.

Well, it's useless to argue with a free-soul like Tom Simms.

"O. K. I'm going now, Tom," I said. "But I'm coming back tomorrow—and I'll bring some other people with me. Folks have got to know."

HATING to leave him alone there, I started walking toward the road and the filling station several miles away, where I'd left my car. I was feeling pretty ugly and nervous. I was hoping that there was some kind of nuisance law that could compel Tom Simms to do away with his ghoulish pets, or at least to have them transferred to some place where trained biologists could watch them.

But then a funny thing began to happen to my anger. It sort of dulled away. A foggy disinterest in all of Tom's marvelous discovery began to come over me as I plodded across the desert.

"None of your business, Hal Chester," I began muttering to myself. "None of your darn business. Might as well keep your mouth shut."

Just once I looked again at my right hand. It had been smeared with juice from the meteor plants recently, and those small lacerations from the thorns afforded an easy passage to my blood stream.

A dim, half-hearted panic came over me, then. Some drugs, even those we know about, are plenty subtle. They dull emotions. Inspire wild, artificial courage, subdue fear, bring indifference. There are even some that'll make a man tell the truth.

Was there something in the juice that had covered my fingers—a drug which the meteor plants had created—willed—within themselves, for a purpose—by means of some subtle

chemistry of their own life processes? What I'd seen of them, seemed to indicate that they worked with life—not with metals and things, as men do. Had they compelled Tom Simms' loyalty to them with a similar though not identical drug?

Briefly my panic sharpened, then faded away, as if under the influence of some unnamed anaesthetic. But I didn't care any more. I drove back to Tucson in a daze. For nearly a month I went about my work quite like a living robot. Outwardly, I suppose, I seemed quite normal, tending my machine shop. But I said nothing about my recent experiences, feeling dimly that nobody would believe what I had to tell, anyway.

But at last a strong craving came over me, though I was still a trifle dazed. I needed more drug. That was the principal reason why I drove back to Tom Simms' place, there in the desert. I went alone, like a dope fiend, hiding a secret.

The stove in old Tom's adobe hut was cold. Dust was thick on his stacks of magazines. There was dust even in his frying pan. All this was plain evidence of long desertion. Something had happened to Tom. Nor, in the brooding stillness of late afternoon, could I hear the sounds of his machinery.

The mounded test-tube house looked the same as before, but the engine and the pumps attached to it had stopped, apparently when the fuel had run out. The lizard and the cactus, which the meteor plants had been exploring with the filaments and suckers of their runaway roots, had both died. But near their withered remnants, pulpy stems and leaves were growing. The roots, boring up from beneath the foundations of the test-tube house, had sprouted new shoots that looked dif-

ferent from those I remembered. The skin that covered them was less thick, and their color was a brighter green. The meteor plants, perhaps by some willed changes in their structures—controlled and directed growth—seemed to be adapting themselves to Earthly conditions. In time they might succeed—

SWIFTLY I broke into the test-tube house, not bothering to use the air-lock box as was normally intended. Atmosphere was pulled into the interior with a whistling sigh—for though the exhaust pump must have stopped functioning quite a while ago, there was still a fairly high vacuum inside.

The meteor plants here in their shelter were wilting badly, for they must have been long untended. They scarcely stirred at my entry, though their brooding eye lenses still seemed to stare at me calculatingly.

Among their massed leaves there was a queer growth, composed of hundreds of tightly wrapped, woody tendrils, amalgamated together, forming a sort of huge cocoon. I didn't have to wonder long what it contained. My fears and suspicions prompted me. Besides, its shape was suggestive. As long as a man, and a little broader, with gruesome contours that hinted at head and shoulders and arms and legs—like some crude Egyptian mummy case, made out of spiraling vines that had grown together.

I didn't have to be told that old Tom Simms was entombed in that woody mass. All the wonders I'd seen in connection with the meteor plants, seemed to increase that panicky horror that squirmed in my blood, now. These monsters were carnivorous after all, it seemed. Somehow they'd captured Tom. Huge, man-eating plants. Stories

of things like that came out of Africa—only this vegetation had come from much farther than the Dark Continent.

All the craving for drugged juice, and all that dazed indifference that I'd felt before, was driven out of me now, by retching revulsion. I stumbled out of the test-tube house, and staggered off into the desert. I wanted to straighten out my thoughts. I didn't think of the miracles of another science, directly. I just tried, from a human viewpoint, to realize what had happened. I struggled to get the last traces of that dull fog, that had obscured my mind for so long, out of my head. For one thing, old Tom was gone, his life done, futile in spite of that brilliant brain of his, with all its inventive possibilities, squandered through the years.

Thus, as I roamed aimlessly, the blue desert shadows lengthened. A cougar screamed eerily as the stars began to burn. Not until then did I turn back, across the hills.

IN THE test-tube house, I groped with a flashlight. The cocoon of amalgamated tendrils was broken open along its length—like a seed pod. From the edges of the rent there dripped an albuminous stuff—that, and shreds of clothing. This seemed the true, final depth of all possible horror. The cannibal plants had apparently discarded what they could not devour. I touched the cocoon, or vegetable stomach, gingerly, avoiding the spines. Yes, it was warm.

I did not know that in that cocoon I was looking at the greatest miracle I had ever beheld. Something closer to the fountain of life than any human wizard has ever penetrated, or maybe ever will.

Sickening hate, and lust to de-

stroy was all I felt. Like a coldly maniacal fiend, I went out and found a drum of gasoline. A minute later a huge, red flare, tipped with black smoke, leaped toward the sky. The glass roof of the test-tube house buckled with heat and fell in. Those meteor plants from somewhere among the stars, sizzled and sputtered as fire ate them. They were dying, and all their unholy knowledge was dying with them.

I had staggered back to watch, when a voice spoke behind me: "You damn, crazy fool, Hal Chester! What did you do that for?"

It was Tom Simms' voice, speaking to me, when I had every reason to suppose that he was dead! Tom's words were shrill and excited and anguished—but without their usual cracked and ancient tone.

I just turned around, dumbly. I couldn't say anything. My old friend was there, in the dancing lurid light and deceptive shadows. Though he was vastly changed, I couldn't mistake the shape of his head and the cast of his thin nose. He was wearing only a crumpled and much-patched pair of dungarees, that he must have just gotten from his hut.

"Hal," he croaked at last, not sounding angry any more, "maybe you did right after all. They were dangerous—those meteor plants. They needed me. That was the only reason why they saved my life."

"Saved your life, Tom?" I questioned at last with foggy confusion.

"Sure," he returned raggedly. "I had a heart attack a couple of days after you left, that other time you visited me. I was in the test-tube house when I keeled over. Vines began to wrap around me before I lost consciousness. I didn't wake up again, till that funny shell split open, just a little while ago."

Tom's words shook, as though he was afraid of them, and could hardly believe them himself. But during the next few moments, I managed to realize that stupendous, staggering truth. Something had happened to Tom, while he lay in the warm fluids that must have filled that cocoon. Now I began to grasp the true extent of the knowledge possessed by the meteor plants. A science of *life*—not of inert metals and clumsy instruments. They worked with *life*, building organic chemicals within themselves, and doubtless feeling, too, as Tom had once hinted, the ultimate pulse of protoplasm, by means of senses unknown to humans. Small wonder, then, that, in their own field, they could far surpass the marvels of Earth scientists.

Tom Simms stood there before me, straight as an arrow, with the firelight flickering on his muscular torso and high, pale forehead. All the years and the infirmities had been stripped from him. He looked—not seventy—but nineteen. Not a pathetic might-have-been, with so many wasted talents. but a kid, ready and eager!

The meteor plants had rejuvenated him, doubtless for their own

selfish purposes, because they needed a strong young attendant. But now there would be another story to tell.

"Tom," I urged waveringly, "we've got to get you back to civilization and buy you some clothes and stuff. The State University has already opened. But that won't matter—for you. I'll lend you some dough. Figure it'll be a good investment."

His slim, steady fingers curled, as if they were already touching instruments lovingly. But there was something else in his attitude, too—something awed and deep and admiring, as he looked up at the stars, and down at the still-blazing test-tube house.

I guess he was feeling the same things that I was feeling. The distances of the Universe, and its endless enigmas. The meteor plants were hideous and horrible—but they'd fought courageously for survival on an alien world. Their tremendous pluck and weird knowledge were worth many reverent thoughts. And behind them, unwillingly, they'd left for Tom Simms a tremendous legacy.

"Gosh, Hal—" was all he could say.

THE END.



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KLYSTRON FORT

By William Corson

The klystron forts weren't comfortable or diverting places, so the boys had a pet—a pet whale. The only trouble with having a pet whale in war time was that it could be mistaken for a submarine—and vice versa!

Illustrated by Kolliker

"SHE's gotta be killed!" said Clark.

"No!" said Chick.

"She's goin' to wreck this bloody icebox if she isn't!"

"Look, lieutenant, dear—she'll go away by herself if we just quit turning the lights on her. Never saw a white one before—she's beautiful!" Chick Taylor swung the cover over the bull's-eye window. "There ain't no record of any damage on that account. If they didn't have windows in these refrigerators, there wouldn't be any trouble with curious fishes like Gypsy Rose, anyway."

"Nuts!" retorted Clark. "The ports aren't to amuse fish; they're to keep farmers like you from getting any more claustrophobia than you already got." He took his feet off the instrument table, sat up in the swivel chair and started going through the bulging pockets of his heavy, fleece-lined coveralls. "In the first place, how do you know it's a 'she'? I'm not that familiar with whales—ever!" With a grunt of satisfaction he produced a moth-eaten plug of tobacco and set to worrying it with his teeth.

"Looking at the underside of a wave is sure a swell cure for claustrophobia!" snorted Chick.

"Honest, that's what they're for," asserted Clark. "Maybe it don't seem like much, but they tried it out. And for another thing, it breaks the

monotony. Ain't nearly so many forts reporting each other as mysterious objects cutting the beams."

Chick sprawled on his bunk. "Huh! That's because the admiral said the next guy did that got permanent North Atlantic destroyer duty. How about we make a deal? You don't report Gypsy Rose to the *Polaris* tomorrow and I'll play you a hand of chess after dinner every night. *Yoicks!*" He rolled out of his bunk and leaped to Clark's side as a shrill beep came from the telltale attached to the wall over the intricate panel machinery.

Clark sat rigidly at the table, his eyes intent on the instruments. He twirled one stud a fraction and the faint beep came again, while one needle in a row of graduated dials jumped slightly. Back with the stud—the needle jumped and the horn beeped. Farther out in the opposite direction he spun the control, and with it the south surface hinge of the miles-long wall of beams that fanned from the fort swept forward across the ocean. No sound from the telltale and no needles jumped. Clark returned the stud to its original position and sagged back in his chair.

"Great invasion! Fully six feet long and at least half a mile from here!" He waved a disdainful hand at the instrument table and its pyra-



mided panels. "Any gadget that can't offhand tell a log from a battleship needs glasses!"

CHICK walked over to the combined washstand and kitchen sink and peered into the mirror hung over it. Sweat from the gray-painted steel walls had run down its surface in such quantity that it was permanently streaky. He wiped a section and scrutinized his face with attention, fingering his short beard.

"Y'know," he said, "I think I'll shave it off. It seemed like a good idea, but now it—well—it doesn't itch exactly, but it *bothers* me! How about it? I play you chess and I don't make any more cracks about that dirty stuff you chew and so you don't set the squad off the *Polaris* after li'l' Gypsy Rose. Oke?"

Lieutenant Clark chewed ruminatively for a moment and then said:

"Oke. But you're the one that gets out of bed at three a. m. and listens for motors the next time she sets off the klystron by playing submarine. So help me, I'll crawl out of a port and strangle her if she does it to me again. I don't mind being scared to death by her petting the icebox and turning us upside down now and then. That's the navy department's worry," he continued with heavy sarcasm. "They only put us down this far so the equipment could sit on an even keel, but what's a war compared to your love for that infernal goldfish?"

"She hasn't done a thing for a week, now," defended Chick. He was snipping at his beard with scissors from the first-aid kit. "Everything in these forts is bolted down tight, anyway."

"I'm not bolted down tight!" snapped Clark.

"You don't try. Why do you suppose they ever called them forts?"

Not even a pistol in the place—we'd be a pushover for a peevish trout."

"Well, it's like this," said Clark. "It's a long story—I'll tell you about it." He swung his chair around to be able to watch Seaman-Radioman Taylor's operations, slumped as low as possible and put his feet on the air-conditioner unit that hissed softly in the middle of the floor. "I worked with Atlas Electric up to two years ago on the television-guided torpedo stuff. It wasn't so good. I was the fair-haired boy who doped out how to sink the enemy fleet before it even got within big-gun range." He laced his fingers behind his head and shifted his cud.

"These things wouldn't cut rates," complained Chick.

"They weren't meant for wire. Anyway, we had a couple of planes on each carrier stripped for nothing but high-altitude work. Only carried light short-wave sets to key relays on the mother ships for directing ocean-going, long-distance torpedoes. The boys in the planes sat up at forty-five thousand feet and guided the oversized 'fish' that were launched thirty miles away from the fast mother ships, groups of six as needed. Enemy fighters, antiaircraft—nothing could get up high enough to bother them."

"Nuts! They couldn't see torpedoes from forty-five thousand feet," Chick objected.

"Ah! True. *But they could* see the trails of white smoke that working the right relays let go. Telescopes. They could swing the 'fish' around, line them on with a burst of smoke, and then charge the enemy, time and again, all afternoon, until they got him. Torpedoes run out of fuel? Yell for another squad! Relays to set full one-hundred-eighty-degree turns, and so on. Beautiful!

All mine!" He smacked his lips complacently.

"Might work," said Chick dubiously, through a thick layer of lather.

"*Did* work, you cynic!"

"Why don't I hear about it, ever? You know I'm in the navy, too!"

"Well, we were at peace when it was first broached. So a newspaper wrote it up in a feature article about our magnificent navy and its powerful secret weapons, so-o-o the little brown brothers—I mean yellow ones—hopped up and stripped down some planes. To the last but one machine gun, see? And *those* ships could make forty-five thousand, too. We dropped it."

"Where's the television come in?"

"Ah . . . later . . . uh . . . well, you see, we built these forts and—it all comes back to me—we were hanging televisors above them at thirty thousand on cables from balloons, and were going to run the same big torpedoes out from them and knock off the enemy at any distance, but—you know how it is—bugs in all these Goldberg inventions—". He trailed off with a vague wave of the hand, spat in a bucket under the chair and sank back.

"Whadya mean—bugs? They plain didn't work?"

"Oh, no! They worked fine, but—well—you see, the seagulls ruined the visibility on the televisors!"

Chick shaved on for half a stroke and then wheeled and said sternly: "Gotcha!" He wagged the razor like a district attorney's finger. "How'd seagulls get up to thirty thousand?"

Lieutenant Clark glanced hastily at the wall clock and sat up. "Supercharged," he replied smugly. "Time to check communications—don't bother me." He snapped a switch and said quickly: "Klystron Fort 9, Clark: testing—Klystron Fort 9, Clark—"

AST—4h

Chick spluttered indignantly.

"O. K.: one, two, three, four—acknowledged!" broke in the annunciator on the wall. "Go away now—you're only one of fourteen little forts that want to talk to daddy."

The annunciator hum ceased. Clark snapped off the contact and spat.

"If I were Emily Post, I'd tell him he was talking to a commission."

"Whatever became of the old discipline in this man's navy?" inquired Chick in a cavernous tone occasioned by dipping his face in the basin to wash off soap.

"I'll swap you and get dinner if you'll cook lunch. My feet are asleep." Clark yanked down the zipper on a "mukluk" and reached it to rub his foot. "Don't think there's even a C. P. O. in these sardine cans; Sparks probably doesn't know he's face to face with rank."

"How'd you get so rank as t'be sent out here?"

"Ah!" Clark grinned and winked mysteriously. "I had pull!"

Chick said: "Nuts!" One hand grabbed a towel, the other yanked a lever. Water gurgled and compressed air rumbled outside.

THE HOODED LIGHT over the instrument panel left the rest of the little "fort" in dimness. Steady snoring from both bunks drowned out the hiss of the air unit. The wall heaters were not on.

"*Bee-eeep!*" said the telltale.

Chick sat up, then subsided to one elbow. Clark, in a flurry of blankets, leaped out of bed and into the chair before the control board, howling as he sat down on the cold leather. A glance at the indicator needles and some quick twisting of a dial, then he leaped back to his bed and smiled happily.

"All right, Admiral Taylor, m'friend! Take over with the earphones and start playing around. It's your little sweetheart, Gypsy Rose. See if her motor's running!" He pulled his covers high and turned over.

Chick sat up and glared reproachfully at his superior's back. One reluctant foot touched the floor boards and he winced. A soft snore came from the other bunk. He got up, clad in regulation but thin pajamas.

A quick check of the dials and a flick of a vernier. It seemed Gypsy Rose was cruising placidly near the surface, about ten miles north of the fort. He switched on the sound detector and spark-and-oscillation pickup and shudderingly put on the icy, damp earphones. A preliminary wide swing over the suspicious region and he heard nothing. A drop of water ran off the headset and trickled down his neck. Chick yanked off the phones and dove for his bunk.

"Beep!" Then, a second later, another beep.

"Ye Gods! Grand Central!" moaned Clark, bouncing out of bed.

"I'm now *supposed* to be on watch," murmured Chick.

"Then whadya doing in bed? Nope, past eight; I'm 'It.'" Clark was checking the instruments as he spoke, and the telltale was emitting a series of beeps.

"Lordy, seven ships heading west!" He swung the radio loop and turned on power. "No warning—don't understand it." While the tubes warmed he pulled on his coveralls, then sat down and pulled out the lazy-tong desk "mike."

"Ship ahoy! Who are you?" Over his shoulder he appealed to Chick: "Wotinell d'you say to a fleet? 'Who goes there,' or what?"

"Must be swell to be a technical

officer and know everything!" marveled Chick.

"Ship ahoy! All of you! Who are you?"

The annunciator buzzed faintly and then a voice boomed: "German high seas fleet on the warpath! Who the devil d'ya think we are? And what do you mean by calling us?"

"Oh, Americans," muttered Clark. Then, into the mike: "This is Klystron Fort 9 calling. Are you a convoy? What are you doing so far south?"

"Aren't you on speaking terms with the shore?" inquired the annunciator. "Icebergs above Ten. This is the *Cestus*. And you'd better have a good explanation ready by the time we anchor!"

"*Cestus*? Is Krantz aboard?"

"This is *Lieutenant Commander* Krantz! And may I ask who you are?"

"Don't be so stuffy, you padded Dutch midget!"

"What? Why, you'll be in the brig so long that . . . that— Oh, *hell*!" raved the annunciator. "Who are you?"

"Temper, tem-per!" admonished Clark in dulcet tones. Chick was listening with popping eyes.

"Don't 'temper' me, you telephone-operating idiot!" grated the irate captain. "When I find out who you are—and I will," he bellowed, "I'll make you wish you'd never heard of the navy!"

"Why, Dutch, your disposition's gotten worse! *Tsk, tsk!*" Clark wriggled with enjoyment.

"Dutch?" whispered the voice. Silence for a moment. Then: "I'm going to kill someone. Is this Cameron?"

"This is Lieutenant Commander Thomas Barton Clark, m'boy.

Haven't you a single friendly word for an old schoolmate?"

"Hell's bells," said the voice, faintly. "It's the old Genius, himself!" Then, booming: "Thought you were out in California, retired. Glad it was you, though—thought for a while that I was going crazy—even though y'can expect almost anything from the bunch of draft dodgers they got down those tin cans."

"I was only out for six months—got yanked right back in when the fracas started."

"Gotta cut this short; look me up when you get loose, willya?"

"Sure; get me a redhead. So long!" Clark broke the contact and spun around to face Chick.

"DUTCH was my roommate at the academy," he explained.

"Well, well. And I thought he was a mere lieutenant. Now my cell-mate's a lieutenant commander. Come clean, what is this new installation? Please, sir, kind sir?" begged Chick, looking as formal as he could while draped with bedclothes.

"Quit heckling. I told you I couldn't tell. Not till I get the go-ahead. You're an M. I. T. man and a thirty-day sub-worker, so to speak, or you wouldn't be in this particular icebox." Clark turned on the wall heaters and started fussing with the coffeepot. "I've been off 'line' work and busy with civilians so long I hate the formality I'd have to use if you were an ordinary enlistment. But forget this on your next job, or you'll lose a lot of hair, even in 'Construction.'" He turned on the hot plate and continued:

"This was to be a four-day testing job on a jury-rig installation. Then they said the rest of the stuff wasn't ready and to wait. That was over

three weeks ago." He ran a thumb over his toothbrush and cursed. "Never dry out! Hell! You're here because I yanked you out of the records."

Chick got up and washed his face, groaning. "Fiend! Kidnaper!"

"Can't be long, now," defended Clark.

"Why didn't they send one of the guys that worked up the gadget?" He nodded at the canvas-draped cube at the left of the instrument table.

"They did—me! The rest are building more installations, or finding bugs in this one, or just snickering at me out here on ice; I dunno! I can't start calling Washington and that way indicate there's something odd about Klystron Fort 9: this is supposed to be hush-hush."

"They've forgotten you and called the whole thing off," suggested Chick.

"Could be! That's why I can't explain until they say 'unveil!'" Opening a steel cupboard, Clark asked: "Boiled or fried?"

"*Bzz-bzzt!*" said the annunciator, red light glowing. Chick leaned over from the port through which he had been peering and flicked the communication switch.

"—ort 9! Shore calling Klystron Fort 9! Shore—"

"Go ahead, Shore," instructed Chick.

"Rough weather! Big waves out your way around sunset. Twenty-three of them!" announced the voice.

Clark yelled from his bunk: "How come you didn't tell us about the switch in the—ah—storm path that brought the seven big 'waves' in through last night?"

"What? Oh—we were busy. The

Old Man said you'd find out, anyway."

"We did," Chick said, "with sound effects! Got hell for talking to a convoy."

"For talking to the waves," corrected the voice.

Clark snorted over his book.

"Yeah, sure, 'waves.' If there's any kickback, you get the buck, chum!" replied Chick, irritably.

"Aw, you'd have called them, anyhow; they were way late!"

"You know I'd put in a call to you and you'd call them if I even suspected they were a convoy—late or not!" snapped Chick.

"You should have, 'as it was!'" said the voice, triumphantly. "I just said that to catch you. Don't you bother to read the K. F. Manual?"

"Aw—no use arguing with a sea lawyer! You just call us next time you're supposed to, and we'll take care of our end." Chick snapped off the contact and turned to Clark. "Y'know, the lug's right!"

"Nuts, what do they expect when they put a couple of Construction men on a Communications job? These beams are leak proof, anyhow."

"They don't think so. Twenty-three big 'waves' coming our way, indeed! If that'll fool anybody, I'm Mickey Rooney."

Clark looked at him with disfavor. "Don't say that, even in fun. If I thought there was the slightest chance of it, and I was shut up in here with you, I'd open the sea cocks!"

"Are there any?" inquired Chick.

"Not a sign of li'l' Gypsy Rose today," observed Chick after wiping and peering through the last of the four thick bull's-eye ports.

"She'll be back," said Clark in a

pessimistic tone. "She loves you." He spat from his bunk and hit the bucket under the chair with neat exactitude.

Chick shuddered at the sound. "How could she? Through an inch of steel, I mean?"

"She must; she doesn't hang around any other fort. They'd report her. According to regulations!" he added, pointedly.

"It's nice of you, but maybe she just loves the fort; very likely it has more sex appeal than the others," said Chick.

"It's your aura!"

Chick sat down at the controls.

"I think I'll fish around with the beam for a minute and see if I can pick her up."

Clark stretched his long legs and yawned. "'Sawful," he murmured, "narcolepsy is an occupational disease down here." His voice trailed off and left a soft snore in its place.

"Hey!" yelled Chick. "She's on the bottom!"

"Huh? We are? Oh. Oh, yes," Clark muttered. "Your fish. Jus' wants to sleep. Me, too. Bright fish." He rolled over and faced the wall.

"No, wake up! Whales don't sleep on the bottom. She's layin' still—something's wrong with her!"

"Not at all," protested Clark, drowsily. "You don't have to have anything wrong with you to want to lie down on a nice, soft sandbank and take a nap. You're unnatural."

"But maybe a destroyer found her and dumped an ash can on her," anguished Chick.

"Good riddance. If anybody found out we've been letting that bimbo zoom around playing submarine, we'd get the firing squad. Read the Manual! —that there may be no possibility of mistaken iden-

tity.' And pipe down." He pulled his coverall collar higher around his ears.

Chick gnawed a fingernail. "There hasn't been an enemy ship this far over in months. Nothing happens and we sit here and freeze slowly. They've got insulating lining down to Eleven. But it ain't supposed to get cold south of Halifax."

No reply.

"I'm going to be a pacifist and get a nice, warm concentration camp." Still no reply. Chick tried once more.

"These ultraviolet content lights are supposed to keep us tanned and full of vitamins. Hell, you got to keep so bundled up to dodge pneumonia that nothing tans but your nose!" Snore answered.

"Bzzt-bzz-z!" said the annunciator.

Chick, nodding in the chair, sat up and threw the switch. Clark rolled over on one elbow.

"Fort 9! Fort 9! Supply Ship *Polaris* calling Fort 9!"

"Go ahead, *Polaris*."

"Skipper wants to talk to you; wait a minute." A click and then an annoyed voice: "Nine? Hello, hello, Nine?"

"Yes, sir," admitted Chick.

"Mr. Clark?"

"He's right here, sir!"

Clark took Chick's place in the chair. "Lieutenant Commander Clark speaking, sir."

"Commander Lloyd, Mr. Clark. I just saw a whale up here. I'd have sent a boat after it, but I've got an idea."

"Yes, captain?"

"I've been intending to get a spare tug and make up a—uh—you know, but I've been too rushed; 'sbeen impossible. My orders give me a good deal of latitude, and—uh—I had a

possibility for the end of the week, but how about the whale if it continues down your way? Got to get the nuisance, anyway, and if you can—uh—handle it, any—uh—ship would be easy, I should say."

"Why, I imagine it can be done." He glanced at Chick who was squatting Turk-fashion in his bunk. "Very erratic path, I'm afraid, sir, but possible at reasonable range. A good-sized whale?"

"Very big. Light-colored, too, almost white. Saw it about forty miles north of you on our way up here. Surprised it hadn't gotten in the beam. We'll be at Ten in a couple of hours, and won't try to get to you before morning. Which reminds me: take a wide sweep for other shipping before you—uh—try it!"

"Yes, captain, I'll check thoroughly before any action."

"Very well, Mr. Clark. Carry on!" The connection was broken.

Clark spun around and said: "Sorry, Chick. Guess that means curtains for Gypsy Rose."

"Curtains—how?"

"That gadget," he nodded at the canvas-covered cube, "is a plotting machine. Another rumbatron built in that works in tandem with any one of our beams. You remember my mentioning oversized ocean-going torpedoes? There are two of them in jury-rigged tubes below. This is a war and if this pans out, half the shore patrol can be released for convoy duty."

"If it's that important, why haven't they made a point of trying it before?"

"Well, I had a battle getting this installation, even after inshore trials. Nobody with a big say is very sold on it yet—claim small-scale experimental work doesn't approximate service conditions. Sorry. Gotta hunt up Gypsy Rose, now."

"Yeah, I suppose so," Chick admitted morosely. "Say!"

"Huh?"

"An hour and a half ago she was on the bottom thirty-five miles or more inshore. How the devil could she get forty miles north of here in that length of time?"

Clark stared at him in silence for a moment. Then: "Mr. Taylor, that's a very good question!"

"CHICK, we're in a sling." Clark took off the headset and switched off the listening apparatus. "There's a whale-sized object moving around with no motor noise or spark about forty miles north. There's a whale-sized object laying on the banks about the same distance inshore. Are you sure it's not a plotted wreck?"

"Positive. I looked it up."

Clark blinked and inspected his fingernails. "Did you listen for motors last night, while your superior was asleep when he should have been supervising?"

"Absolutely! But . . . well, not very long," admitted Chick sheepishly.

"You're sure whales don't lie on the bottom?"

"I'm sure I *read* that they don't. Maybe it wasn't that I didn't listen long enough. Maybe right then he had his motors shut off so *he* could listen."

"Maybe." Clark scowled and combed his short beard with his fingers. "We don't *know* it's a sub. But how are we going to find out without calling a chaser patrol? And what do we say if it is? Son, think fast!"

"Say!" Chick brightened. "That convoy your friend is with will be in there in less than an hour. He could get 'em!"

"That's a last resort. A destroyer

can't go on a wild sub hunt miles behind the forts without some explaining. Come again." Clark chewed on a thumb, then fished for his tobacco. "Of course, it might lie right there and wait for outgoing ships, instead of sinking empties." He bit off a huge chew.

"But we can't take a chance," Chick moaned. He drummed his feet against a bunk brace and said: "We gotta tell them!"

"You and your dear, damned fish!" Clark slumped in the chair, chewing slowly with his eyes shut, then abruptly sat up.

"Say! Gypsy Rose may come in handy yet—I've got the start of an idea." He snapped on the communicator and yelled: "Get the cover off the plotter! Take a fix on the convoy and get one on the sub—to an inch!" He spun the loop aerial and started calling:

"*Cestus!* Klystron Fort 9 calling *Cestus*—"

"Hey, I can't work this infernal machine!" complained Chick. Under the canvas he had found an affair that looked like a more-than-usually complicated adding machine, inset with a number of dials and a large ground-glass panel, etched with fine graduations.

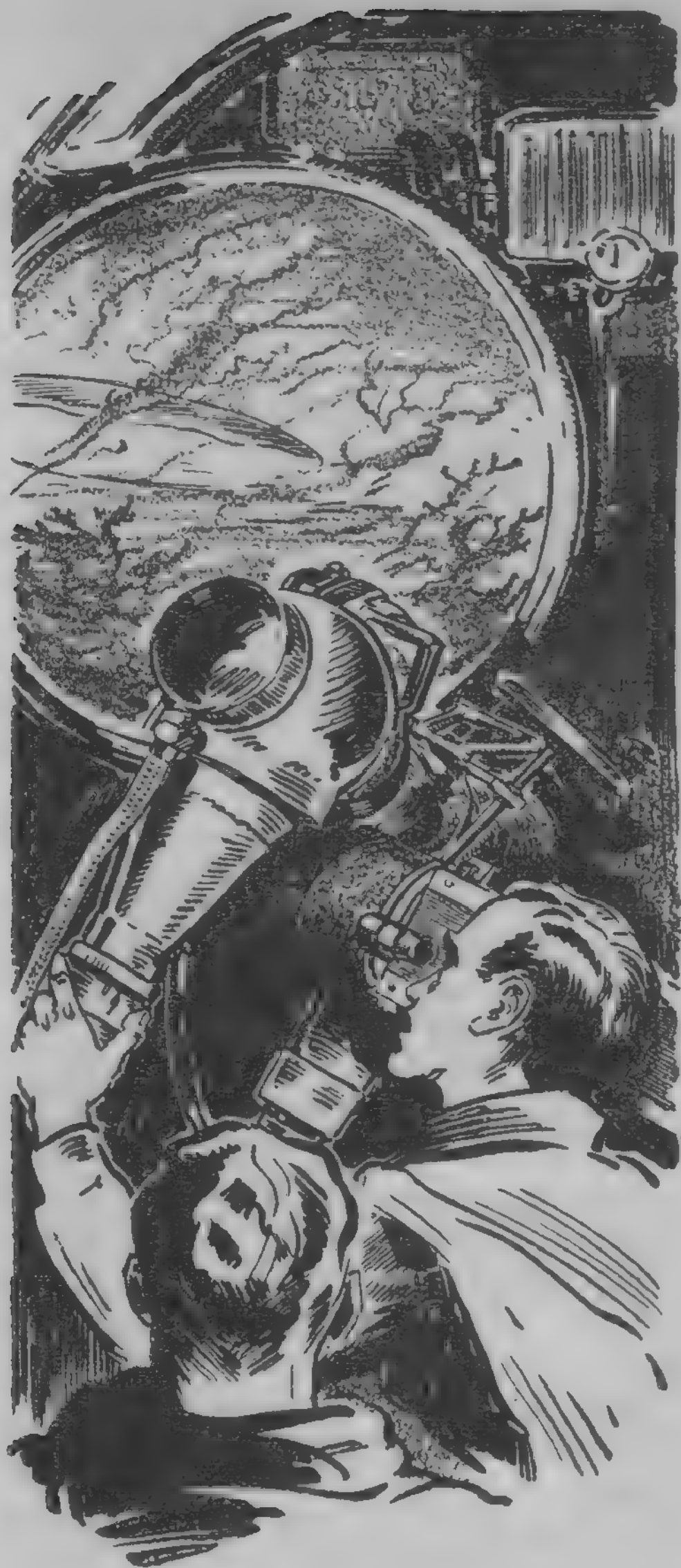
"Oh, use the regular beam, but make it close! Klystron 9 calling *Cestus*—"

"Go ahead, Nine," invited the annunciator.

"Lieutenant Commander Clark. I want to talk to Captain Krantz, right away!"

"Yes, sir; I'll connect you with the bridge."

CHICK FUSSED with the beam controls and checked each "beep" from the telltale, then picked up a pencil. "Got the sub. These verniers are slow when you're in a hurry!"



"Yeah, Tom," boomed the annunciator. "What's on your mind?"

"Dutch, look! I'm in a spot and you can do me a big favor, if you will."

"Sure, if it's not too much against regulations."

"Where are you in the convoy?"

"Astern, why?"

Clark glanced at Chick. "Fix for

him!" he commanded. Then: "Dutch, could you drop a can on a whale—two or three cans? If it wasn't very far off your course, I mean?"

"Yes. Supposed to."

"Just a second, then. I got you one." He clamped his hand over the "mike" and asked: "Where are they, Chick?"

Chick put a last dot on a projection map and put down a ruler. "About eight miles east of southeast of the sub."

"Oke." He uncovered the "mike." "Dutch, the whale's about eight miles west of northwest from you. Could you alter course enough to touch that?"

"Why not? They're empty—going no place. Get to work on your plaything." He gave course and speed, and Chick took them down as Clark repeated. Then Clark said:

"Half a mo' and I'll have it. You're a lifesaver!" He made shooing motions at Chick. "One side and watch a man work."

Chick bounced out of the chair and Clark sat down and rubbed his hands, then threw a switch at the head of the adding machine. "This one puts a new set of verniers and the new beam to work. It's a lot finer for accurate work. Now we feed in course and speed." He punched keys. "And our sub"—more keys—"and that beautiful little clock affair gives us our time interval for conjunction. Hm-m-m. Duddly-duddle. Or does it? This is a little in reverse of what it was meant for."

The telltale had changed to a low whistle, in the place of its usual beep.

Chick looked baffled and made encouraging sounds while Clark frowned at the machine.

"Oh, yes!" Clark brightened and altered the set-up. The steady whis-

tle broke into a series of short tweets.

"Now it's following automatically—as long as it sounds the dots. The time is— Hm-m-m—" He grabbed the "mike" and shouted: "Got it, Dutch! Are you still there?"

"Sure. No place to go. Let's have it."

"It's now 8:17 a. m. Right? At 8:49 you alter course to three-two-eight degrees. Stay at fourteen knots and let fly 9:12 on the dot, then two more at thirty-second intervals. Right?"

"Just three? A few hundred pounds of high explosive seems hardly enough. But O. K.; alter to three-two-eight at 8:49 and bingo at 9:12. Dear me, only three. What a whale!"

Clark grinned and winked at Chick. "Oh, and you stay to starboard of your convoy. Then hightail it for shore as fast as you can." His figure began to lose its tenseness. "One more thing, Dutch. Please keep the deck and keep your eyes open. I may yell for you quick, if my idea doesn't work."

"What? Say, do we get this whale or don't we?"

"I'll tell you when I see you. Incidentally, you are going to see this whale yourself. If anyone asks you, it's a very large white one."

"Me seeing white whales? Mobey Dick's dead and you're drunk!" screeched the loud-speaker with tinny indignation.

"No, I'm on the level. You can prove by Commander Lloyd on the *Polaris* that there's a white whale in this region. But don't fix the spot too exactly. 'Bye now. If everything jells, you won't hear from me till I see you ashore."

CONNECTIONS broken, Clark turned off the new plotting machine and hurled himself into his bunk.

"Chick, glue the beam on that sub and leave it there! Better take a sweep out front first. And move one of the bottom beams more up to level, to fill in."

The low, steady *bee-e-p* of the tell-tale filled the room as Chick set the beam. He turned down the volume.

"Lordy, lordy! First time I've ever been warm in this can!" said Clark, mopping his face. He raised his head and arched a high trajectory shot at the bucket.

Chick chanted: "Give the man a see-gar! But what happens next? He won't hit anything with those directions."

"Nope. Don't want him to. Have to explain oil and wreckage if he did. Not sure he could. Look, you're a sub commander. You hear ships inbound. Then, inshore but near, it gives three fast ash cans that shake you up plenty. Then, you hear the ships hightail for shore. You figure to lie low and keep motors off. Then you get to thinking. *Why?* Why shoot and then run? Afraid of something, obviously. But you can't leave without motors, and maybe someone's coming out to see about it all. Maybe they're onto you!" Clark scowled threateningly at Chick. "You worry. You by-and-by blow tanks and drift up to see if a destroyer is lying to, waiting. Hah! Nothing in sight. *What* do you do then?" he bellowed.

"Why, I'd resign," said Chick, weakly. "You've scared me."

"Exactly. Clear sea—troubled future: you move to the next county. I hope. Maybe he takes after the convoy right away. How do you feel about some more coffee?"

"I need it; I'll even go so far as to make it."

Clark rolled onto his back and looked solemnly at the toes of his mukluks. "If he goes after them, I'm

afraid it'll be necessary that I unleash my super-super to get him."

"We get him? How do *we* get him in there?" Chick inquired in amazement, coffeepot forgotten in one hand.

"With that television set-up I was telling you about last night. I just thought of a way to fool the seagulls."

"Bu-but . . . but we haven't got any balloons or television sets!" screamed the baffled Chick.

"That's where the seagulls come in," confided Clark. "A little laboratory work does wonders—an inoculation of parrot blood and truth serum gets accurate information!"

"Owool!" howled Chick, brandishing the pot. "Keep away! Seventy feet under water with a raving maniac!"

"But *not* a whale lover!" said Clark with simple dignity.

THE STEADY DRONE of the telltale did not change as the minute hand edged past the 9:12 mark. Nor at the 9:30 mark. Nor by ten o'clock.

Clark sat clutching the mike, while beside him crouched Chick, eyes shut as he listened to the earphones with strained attention. Eleven o'clock. In response to a nudge, Chick said:

"Not a thing. Maybe it's too far."

Clark worried a finger and said: "He *can't* just sit there!"

The telltale fell silent!

"Ah-h!" breathed Clark. He threw the switch on the new installation and pounced on the control knobs. In a second, the telltale gave a prolonged *twee-e*, then broke into regular dots of sound as the instrument scanned the progression of the object on which its twin beams rested.

"He's surfacing; see this? And

that's why the speed and course aren't working—they're for horizontal moves."

Chick tore off the headset and both men stared eagerly at the divided ground glass. Minutes passed. "How long are you going to look around, U-boat Captain Taylor?" asked Clark.

"Not long; I'm puzzled and kinda nervous. Maybe I go north, maybe I head this way," answered Chick, grandly.

"Come, come, Heinrich! Remember they been catching all your pals over here for months; you don't know how!"

"Yeah. O. K., Svengali. I head east."

At that moment, the spot of light in the upper half of the ground glass began to jerk, in time to the dots of sound from the telltale. It became a leaping pulse that reached to a line marked "two," then "three," and continued to slid up until each flick touched "seven."

"You're hired! Ever been to Hialeah?" Clark patted Chick's back with a heavy hand.

"Yeah, but I only work on subs. Stop it, you're collapsing me!"

In the lower half of the glass, a tenuous needle of light hung steady, parallel to the red line that marked the direction of the beams.

"Boy, what a machine!" crowed Clark. "Never worked better in the shop. That white line is the course. Doing seven knots."

He held up a finger. "Listen!"

He punched a key at the top of the board. Over the hiss of the air unit and the dots from the telltale, there was audible a whirring sound from below. It stopped, then gave another second's whir and stopped again.

"Those are the tubes swinging into line. I sweat blood co-ordinating that outfit. As long as she's tracking up here, the tubes keep correcting as much or little as necessary to keep on the target." He rubbed an affectionate hand over the side of the softly buzzing machine. "I could feed in the data through the keyboard if the scanner went out and we had to keep the beams on by hand. How about a sandwich?"

"It's visionary," Chick disparaged. "Too complicated!"

"Not at all! You ought to see the army's aircraft finders for real complexity. They try to throw in enough machinery to get the same results out of a single beam, hand trained, to run their computing junk. But this baby's accurate! You could adapt it to fire control with a high-speed scanner, and outdo anything they've got. Y'see, the twin-beam idea makes it veer back toward whichever beam is still on, as soon as one slides off." He pulled his knees up to his chest and spun around and around in the chair. "Yeow! How about that coffee, again? Gotta celebrate. He won't be out here for hours."

"Yeah, man!" said Chick.

"SAY, that was darn near the end of the sugar. That's serious!" Chick hefted the nearly empty sack.

"Enough till morning, isn't there? *Polaris*'ll have our new stuff." Clark finished wiping the cups and stuck them on their hooks.

Chick wandered over and studied the dials on the plotter.

"Won't be long, now. Still holding seven—no, it's about eight. Could they figure speed by Doppler effect on this beam?"

"Hm-m-m, I guess so," said Clark. He rolled down his sleeves. "Hate

to do it, though. Velocities on boats are awfully small, comparatively. This interference on the bounce-back is a lot easier. Fine thing, interference."

Chick gave a start of alarm. "Hey! Look here; it's coming out of a hell of a depth—almost a hundred feet! How do we hit it with torpedoes? I mean, we can't get at them to set depth."

Clark grinned. "What do you suggest?"

"Why—get them to 'surface.'" Chick scratched his head meditatively. "Call them up and tell them we're Ostend and just found out there's a submarine net— Hey! I've got it! Let's turn the loop their way and call on commercial wave and yell S O S and that we're the *Empress of Burma* disabled with a cracked shaft right above here, and then hang up quick!"

Clark whooped. "Subtle as a marine! Boy, what psychology!"

"That would even explain why they couldn't hear any motor noise," Chick defended in an injured tone.

"Phooey! And they claim the Teutonic mind is heavy-handed. 'Sall right, though. Your idea is magnificent, but not necessary. We aren't so deep but what they could pack a journal bearing to hold, and run a correction set-up." Clark indicated two small slotted disks inset in the floor. "Those run right into the tubes. I didn't want them, because we were going to shoot at a tow at a predetermined depth, but you know the navy; even these big 'fish' are built with depth selectors, so we depth-select, want to or not!"

"'Swonderful, wonderful!" admired Chick. "Such efficiency! I'm full of awe and coffee. Five cups since noon, I think." He wandered over and collapsed in his bunk.

Clark sat down and fished for his tobacco. "He's heading a little north of here. Looks like about twelve thousand yards, closest."

"Whyn't you figure for sure?"

"If baby here can't figure it, we can't hit him, anyway. He's not the *Queen Mary*! No use bothering our little heads. Gives me an idea, though. I still have to fire the thing. Maybe so fix it to compute most advantageous angle, course, 'n' so forth, and fire itself!"

"He's off! D'ya think you can train it to have a proper reverence for friendly ships in the background? And is it modest enough to know when it's licked? By distance, I mean?"

Clark wagged a foot in time to the steady *tee-tee-tee* of the telltale. "Could be done. Think I'll skip it, though."

"ALL CLEAR to the horizon!" Clark switched the beam back to the scanner. The "dotting" resumed. "About one more minute," he breathed.

Chick fidgeted nervously. "I hope your depth set is right. Were they ever calibrated by test so far down?"

"Don't know. They're marked for it."

On the lower section of the ground glass, the needle of light crept toward a right angle with the red line that marked the beam path.

"Almost thirteen thousand yards!" said Clark in a low voice. Then: "Here we go!"

He spun open a valve in a wall pipe. "Air!" There was a faint whisper below. He flipped out a small plunger and withdrew his hands, saying:

"Now!"

At the second motion, there was a dull, sighing cough. The whole fort jerked slightly.

"Cross yourself, son! Cross yourself and pray that fifty knots gets it there before he changes his mind and course!"

Then Clark looked at the inset clock and said: "A little better than eight—almost nine minutes. What a long time!"

The lines on the glass narrowed to a right angle, and then began to widen again, almost imperceptibly, as the minutes ticked by. Both men

TIP!



FLIP!



PIP!





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were silent at first. Clark moved restlessly in the chair and finally said, almost to himself:

"Maybe I ought to let the other one go, too!"

Chick swiveled his eyes from the glass to the other man's face. "Long range, isn't it?"

"Oh—not really." Clark toyed nervously with the other plunger, then yanked his hand away. "No, damned if I do! Not unless it's a miss. This machine's accurate!" He leaned to a side and spat.

The telltale sang its steady song. Chick tinkered for a moment and then spoke. "I can hear him all right. Hitting on all umpty."

Clark glanced up and said: "Hey, get those earphones off! Turn it off. Knock you loose from your ears!"

He turned back to the instruments and said very slowly: "Here . . . we . . . go . . . again!"

The telltale abruptly went silent. Only the soft hiss of the air unit and the even softer buzz of the plotter broke the silence. Seconds ticked by. Then there was a heavy jarring thump, half sound and half actual shake. Things jangled and rattled in every cupboard.

The two men stared at each other with widening grins. Clark jumped up and began to dance a slow waltz with the air. Chick beat the earphones against the table and sang loudly:

*"The old gray mare,
She ain't what she used to be,
Ain't what she used t'be.
Oh-h, the old gray mare—"*

Order restored, Clark said jubilantly: "We get out of here now! Back to the sunlight! Cigarettes!

The test severe is what we have passed—nobody can say this didn't approximate service traditions!"

He hurled himself back into the chair and began to rock violently. "Coffee, man, coffee! We celebrate again!"

Chick laughed and filled the pot. "I betcha you don't tell anybody which way the sub was going!" He swung out the tiny table and set out cups and spoons.

Clark said grandly: "When you finish that, boy, get me Captain Lloyd on the *Polaris*! Then get me—Whoa! *Hey!*"

The little fort lurched wildly. Cups, slippers, books, sugar and men slid in a heap against the wall. The coffeepot spewed its contents over all.

Clark sat up and began to howl with rage.

"That triple-damned, oversized, albino goldfish! That infernal, blankety-blank— Oh, I haven't the words! So help me, I'm going to torpedo that beast if it's the last thing I ever do!"

The fort lurched again, the opposite direction, and the whole disheveled pile slid smoothly for the other wall. Clark fought madly to get at the instrument table, while Chick, laughing helplessly, clutched at him and held him back.

"You can't kill Gypsy Rose now! She was our alibi!"

Clark staggered to his feet and shook a clenched fist over his head.

"All right! All right! But if we weren't leaving as fast as a relief can get here, not even an order from the President of the United States could save that . . . that . . . owoo . . . that fish!"



Methuselah's Children

By Robert Heinlein

Part Two of three parts. The tale of a race of long-lived humans driven out by the hates and envies that the normal, short-lived feel—

Illustrated by Rogers

The beginnings of the upheaval were laid, innocently enough, in the latter part of the nineteenth century, when a rich old man who feared and hated death was told the only way to assure long life was to se-

lect the right grandparents. It was too late for him to do that—but he determined to do it for others. Establishing a Foundation that would economically encourage the mating of people descended from long-

lived ancestors, he established the Families—Methuselah's Children.

The families of the long-lived, united by their mutual interest in the Foundation, grew into a tight but secret group scattered all over the United States as years, decades, finally centuries passed. The life spans of the children of these matings of the long-lived grew longer and longer as the generations passed, and still the secret was maintained. Members of the Families "died" in one location, to reappear elsewhere under new names—and with a different, much younger, supposed age. For they lived one hundred twenty-five—one hundred fifty—even two hundred and more years normally.

Tired of the secrecy, the uncertainty, the shifting, they decided finally to reveal themselves—or a certain number of themselves—to the rest of the world for what they were, and see what result there would be.

The result was disaster, and this is the tale of the disaster. In 2125 the situation reached the crisis. The normal, short-lived people wanted life, the long, long life of the Families. They would not—and psychologically could not—believe that there was no selfishly withheld secret treatment, injection or medicine that accounted for their two-hundred-year life spans. To admit that inheritance from long-lived ancestors was the way, and the only way, to long life forever denied that boon to the short-lived people who wanted it. The Methuselahs were a living, taunting proof that long life could be had—but they couldn't have it.

Utterly unconvinced, and unconvincible, they demanded that the government force the revealed members of the Families to give out the imagined—and nonexistent!—"secret" of long life.

The Families, having no such secret to reveal, are in turmoil as the rising anger of the mob forces the government to declare all of them enemies of society, subject to arrest. The scattered members of the Families flee to temporary shelter in hidden centers, one of which is under Lake Michigan. Some, unable to escape, are caught and questioned by the government Proctors. Under truth-drug, they reveal the true total numbers of the Families, deny the existence of any secret—but aren't believed!—and tell of the hidden refuge.

Administrator Slayton Ford, head of the government, is wise enough to recognize two things; that there is no secret, and that nothing can possibly convince his people that there isn't. He gets in telephonic

communication with Zaccur Barstow, head of the Families, and asks him what he can suggest in view of the irresolvable situation. Lazarus Long, born in 1912 and an adventurer for the whole two hundred and thirteen years of his life, has made a suggestion. In an orbit around Earth now is a giant spaceship, built and just finished, designed for a trip to Alpha Centauri. It is a successor to the lost *Vanguard* which vanished on the same trip some years before. (The Ship of "Universe.") Long proposes that the Families steal or somehow make away with that ship and seek a new planet in another system. Ford agrees that's the only possible out. But Long points out that the people of Earth will have to be deceived, or they won't release the Families. The Families must be deceived, or they won't have the necessary swift action and unanimity of movement.

Ford, then, must arrest all the Families, confine them in a concentration camp, and let his short-lived normal people snarl around the camp, or the Families one hundred thousand members won't all move when Long and Barstow say, "Move!" Barstow and his administrators must, in turn, keep the fact that Ford is actually helping them a strict secret—or the inertia of human nature will make his none-too-ready followers refuse to believe the danger of a terrible civil war. Andrew Jackson Libbey—"Slipstick" Libbey of "Misfit," the mathematical genius—believes they can develop a method of driving the giant ship that will be fast enough to get them to another star within their own lifetimes.

But the great danger is that some hint of the proposed double-sided double cross—for their own mutual good—will leak out to either the normal short-lived people, or to the long-lived. If that happens, all hell will break loose!

THEY stood around in groups, fretfully. "I can't understand it," the Resident Archivist was saying to the worried circle around her. "The Senior Trustee never interfered with my work before. But he came bursting into my office with that Lazarus Long behind him and ordered me out."

"What did he say?" asked one of her listeners.

"Well, I said, 'May I do you a

service, Zaccur Barstow?" and he said, "Yes, you may. Get out and take your girls with you." Not a word of ordinary courtesy."

"A lot you've got to complain about," said another voice gloomily. Eyes turned to him. It was Cecil Hedrick, of the Johnson Family, communication engineer. "Lazarus Long paid a call on me, and he was a damned sight less than polite."

"What did he do?"

"He walks into the communication cell and tells me that he is going to take over the board—Zaccur's orders. I told him that nobody could touch my burners but me and my operators, and anyhow, where was his authority? Do you know what he did? You won't believe it, but he pulled a blaster on me."

"You don't mean it!"

"I certainly do. I tell you, that man is dangerous. He ought to go up for psycho adjustment. He's an atavism if I ever heard of one."

LAZARUS LONG'S face stared out of the screen into that of the Administrator. "Got it all canned?" he demanded.

Ford cut the switch on the facsimulator on his control desk. "Got it all," he confirmed.

"O. K.," the image of Lazarus replied. "I'm clearing." The screen went dead. Ford spoke into his interoffice circuit.

"Have the High Chief Provost report to me at once—in corpus."

That official showed up with an expression on his lined face in which annoyance struggled with self-discipline. He was having the busiest night of his career, yet his political superior had sent word to him to report in the flesh. What the devil were visiphones for, anyway, he thought angrily—and wondered why

he had ever taken up police work as a career.

"You sent for me, sir?" He saluted with unnecessary punctiliousness.

"Yes, thank you. Here." Ford pressed a stud and let the exposed spool of film from the facsimulator pop up into his hand. "This is a complete list of the Howard Families. Arrest them."

"Yes, sir." The police official accepted the spool and stared at it. He was debating the advisability of asking Ford where he had gotten it. It certainly had not come through the office of the Provost—did the Old Man have an intelligence service which left him out of the circuit?

"It's alphabetical, but keyed geographically," the Administrator was saying; "after you run it through the sorters, send the— No, *bring* the original back to me. You can stop the psycho interviews, too," he added. "Just bring them in and hold them. I'll give you further instructions later."

The High Chief Provost decided this was not a good time to show his curiosity. "Yes, sir."

As he departed, Ford turned to the desk and sent word that he wanted to see the chiefs of the bureaus of land resources and of transportation control. As an afterthought, he added the chief of the bureau of consumption logistics.

BACK at the Seat of the Families there was met a rump session of the trustees. Barstow was conspicuously absent. "I don't understand it and I don't like it," Andrew Weatheral was saying. "I could understand Zaccur deciding to delay reporting to the Meeting, but I had expected that he would call the trustees together for a conference immediately. I certainly did expect that.

What do you make of it, Philip?"

Philip Hardy chewed his lip before replying. "I don't know. Zac-cur's got his head on his shoulders, but it certainly seems to me that he should advise with us. Has he spoken with you, Justin?"

"No, he has not," Justin Foote answered frigidly.

"Well, what should we do? We can't very well call him in and demand an accounting unless we are prepared to oust him from office if he refuses. I, for one, am reluctant to do that."

They were still discussing it when the proctors arrived.

LAZARUS HEARD the commotion and correctly interpreted it—no feat, since he had information his brethren lacked. He was aware rationally that he should submit peacefully and conspicuously to arrest—set a good example; but to do so ran cross-grained to deeper, older strata in his habit patterns.

He delayed the inevitable by ducking into the nearest 'fresher.

It seemed to be a dead end. He glanced at the air duct. No, too small. Absent-mindedly, he fumbled in his pouch for a cigarette. His hand found no cigarettes, but did encounter an object which he failed to recognize by touch. He pulled it out. It was the brassard he had "borrowed" from the proctor in Chicago.

When the proctor on point of the mop-up squad covering that wing of the Seat stuck his head into the 'fresher occupied by Lazarus, he found that he had been anticipated. "Nobody in here," announced Lazarus. "I've checked it."

The real proctor seemed surprised but unsuspecting. "How the devil did you get ahead of me?"

"Around your flank. Stoney

Island Tunnel and through their air vents." He trusted that the official would be unaware that there was no Stoney Island Tunnel. "Got a cigarette?"

"Huh? This is no time to catch a smoke."

"Shucks," said Lazarus, "my legate is a good mile away."

"Maybe so," the proctor replied, "but mine is right back there. You'll be wigged."

"He is, eh? Well, skip it—I've got something to tell him, anyhow." He started to move on past the man, but the proctor did not get out of the way. He was glancing curiously at Lazarus' kilt. Lazarus had turned it inside out; the blue lining made a fair imitation of a proctor's service uniform, but Lazarus was uncomfortably aware that it differed in minor details.

"What station did you say you were from?" inquired the proctor.

"This one," said Lazarus, and planted a short jab precisely under the man's breastbone. His coach in rough and tumble had once explained to him that a solar-plexus blow was harder to dodge than one to the jaw. The coach had been dead since the strike of 1960, but his knowledge lived on.

Lazarus felt more like a cop with the new kilt he had acquired and with a bandolier of paralysis bombs slung under his left armpit. Besides, the proctor's kilt fitted him better than the one he had borrowed from Edmund Hardy.

To the right the passageway led only to the Sanctuary and further dead ends. He followed it to the left instead, which meant that he must encounter the superior officer of his unconscious benefactor. The passage gave into a moderately large hall which was crowded with Members herded into a group by politely

insistent proctors. He ignored his kin and moved on past them to the harassed legate. "Sir," he reported, saluting smartly, "there's a sort of a hospital back there. You'll need fifty 'r sixty stretchers to evacuate it."

"Tell your legate," the officer directed him. "We've got our hands full here."

Lazarus did not answer as promptly as he might have. He had caught Mary Risling's eye in the crowd. She stared at him and looked away. "Can't tell him," he said, catching himself. "Not available."

"Well, don't bother me with it. Take the message outside."

"Yes, sir!" He moved away, swaggering a little, his thumbs hooked in the band of his kilt. He was some distance away in the passage leading to the transbelt running to the Waukegan outlet when he heard shouts behind him. Two proctors were running to overtake him.

He stopped at the archway entering the transbelt tunnel and waited for them. "What's the trouble?" he asked conversationally as they came within speaking distance.

"The legate—" began one. But he got no further; a para bomb tinkled and popped at his feet. He had just time to look surprised before the radiations wiped any expression from his face. His mate fell across him.

Lazarus looked cautiously around the shoulder of the arch, after counting seconds up to fifteen—"Number one jet fire! Number two jet fire! Number three jet fire!"—and adding a couple of jets over fifteen to make absolutely certain that the paralyzing effect had completely died away. It had been a near thing, nearer than he liked. He had not been able to duck quite fast enough, and his left

foot still tingled from exposure.

The still figures reassured him. Perhaps they had not wanted him in his proper person—perhaps no one had given him away, but it was just as well not to know.

He was damn well certain of one thing, he told himself. It hadn't been Mary Risling who tipped them.

Fortunately, the transbelt was still running.

It took two more paralysis bombs and a couple of hundred words, not one of them containing an iota of truth, to get him out in the open air. But once there and out of immediate observation, the brassard and the remaining bombs went in his pouch and the bandolier landed in the depths of a convenient bush. He looked up a clothing store in Waukegan.

He sat himself down in a sales cubicle and dialed the code number for kilts. He let the pictures of cloth designs flicker past his eyes and the persuasive voice of the catalogue drone on until a pattern showed up that was distinctly unmilitary and not blue, whereupon he arrested the display and punched the combination for his size. He noted the price, tore out an open-credit voucher from his wallet and entered it in the machine, pushed the processing switch, and enjoyed a smoke while he waited for the tailoring to be done.

The plain blue uniform kilt he stuffed in the refuse hopper of the cubicle and went on his way, nattily and somewhat flamboyantly attired. He had not been in Waukegan for many years, since before the time of the Covenant, in fact, but he was able to locate a modest middle-priced rest house without having to draw attention to himself by asking questions. He punched the board for a standard suite, in which he re-

freshed himself with seven hours of welcome sleep.

He breakfasted in the suite, listening with half an ear to the news receptor, which was a common "chat-box" installation, without selective controls. He was interested, in a mild way, in hearing what might be reported concerning the raid on the Families. It was a detached interest, as he had already dissociated himself from it in his own mind. It had been a mistake, he knew, to resume contact with the Families, and he was lucky to be well clear of it with his present public *persona* unimpeached.

A phrase caught his attention: "—including Zaccur Barstow, alleged to be their tribal chief.

"The prisoners are being transported to a reservation in Oklahoma, near the ruins of the Okla-Orleans road city about twenty-five miles east of Harriman Memorial Park. The Chief Provost describes it as a 'Little Coventry,' and has issued a warning for all atmosphere craft to avoid it by ten miles laterally. The Administrator could not be reached for a statement, but from a usually reliable source from within the Administration, we are informed that the mass arrest was accomplished in order to facilitate the investigations whereby the Administration expects to obtain the so-termed 'Secret of the Howard Families.' It is believed that the drastic action of arresting and transporting to imprisonment every member of this outlaw group will have a salutary effect in breaking down the resistance of their leaders to the legitimate demands of society. It will bring home to them forcibly that the civil rights enjoyed by citizens must not be used as a cloak from which to damage society as a whole. -

"The chattels and holdings of the

members of the Howard Families have been declared to be subject to the Conservator General and will be administered by his agents during the imprisonment of—"

LAZARUS reached out and switched it off. It worried him. "Damnation!" he thought to himself. "Don't worry about things you can't help." Certainly, he had expected to be arrested himself, but he had escaped. That was that. He could not help the Families by looking up a proctor and turning himself in. Besides, he owed the Families nothing; not a tarnation thing.

Anyhow, they were better off all arrested at once and quickly, and placed under guard, than they would have been to be smelled out one at a time. The other way they had stood a good chance of lynchings, even pogroms. Lazarus knew from experience how close to the surface lay lynch law in even the most civilized. That was one reason why he had suggested the mass arrest—that and the fact that the Families needed to be in one compact group for Barstow and Ford to stand a chance of carrying out their scheme.

But he wondered how Barstow was getting along, and what he would think of Lazarus' disappearance. And Mary Risling—it must have been a shock to her when he showed up making a noise like a proctor. He wished he could straighten that out.

Not that it mattered what Zack or Mary thought—they would be either dead or light years away very soon. A closed book.

He turned to the phone and called the post office. "Captain Aaron Sheffield speaking," he announced, and gave his postal number. "Last registered with the Goddard Field post office. Will you please have my

mail sent to—" He leaned over and read aloud the serial number on the mail receptacle.

"Service," assented the voice of the clerk. "Right away, captain."

"Thank you."

It would take a couple of hours, he reflected, for his mail to catch up with him. By that time the search for him would certainly have lost itself in the distance. He would hire a U-push-it and scoot down to—to where? What was he going to do now?

He turned several alternatives over in his mind and rejected them automatically. He came to the blank realization that there was nothing, from one end of the Solar System to the other, that he really wanted to do.

It scared him a little. He had once been told, and had been inclined to credit, that a loss of interest in living marked the true turning point in the balance between catabolism and anabolism—old age. He suddenly envied the normal short-lived people. At least they could go make nuisances of themselves to their children. Filial affection was not customary among the Members of the Families; it was not a feasible relationship to maintain for a century or more. And friendship, except between Members, was bound to be regarded as a passing and shallow matter. There was no one that Lazarus wanted to see.

Wait a minute, though. Who was that planter on Venus? The one that knew so many folk songs and was so funny when he was drunk? He'd go look him up. It would make a nice hop and would be fun, much as he disliked Venus.

Then he recalled with a cold shock that he had not seen the man in question for—how long? In any case, he was certainly dead by now.

Libbey had certainly been right, he mused glumly, when he spoke of the necessity for a new type of memory association for the long-lived. He hoped the lad would push ahead with the necessary research and complete it before Lazarus was reduced to counting on his fingers. He dwelt on the notion for a minute or two before recalling that he was quite unlikely ever to see Libbey again.

THE MAIL arrived and contained nothing of importance. He was not surprised; he expected no personal letters. The spools of advertising matter went straight into the refuse chute. One item he read, a report from the Pan-Terra Shipping Corp. telling him that his convertible cruiser, the *I Spy*, had finished her overhaul and had been moved to the company's docks, rental to begin forthwith. As instructed, they had not touched the astrogational controls—was that still the captain's pleasure?

He would pick her up later in the day and head out into space, he decided. Anything was better than sitting earthbound and admitting that he was bored.

Paying his score and finding a rocket for hire occupied less than twenty minutes. He raised ground and headed for Goddard Field, flying by contact to avoid having to report in on the beam. But long before he reached there—over Kansas, specifically—he decided to land, and did so.

He picked the field of a town so small as to be unlikely to rate a full-time professional proctor, and sought out a public communication booth close to the field. Inside, he hesitated. How did one go about calling up the head man of the entire Federation—and get him? If

he simply called Novak Tower and asked for the Administrator, he not only would not get him, but his call would be switched to the Department of Safety for some unwelcome investigation. That was a sure thing.

Well, there was only one way to beat that, he decided, and that was to call the Department of Safety himself, and, in some fashion, get the Chief Provost on the circuit—after that he would have to play by ear.

"Service. Department of Civil Safety. What do you wish?"

"Service to you," he began in his best control-bridge manner. "I am Captain Sheffield. Give me the Chief." His tones were not overbearing; they simply assumed obedience.

Short silence. "What is it about, please?"

"I said I was *Captain Sheffield*." This time his voice held controlled annoyance.

Another short pause. "I'll connect you with the Chief Deputy's office," the voice said doubtfully.

This time the screen came to life as well. "Yes?" asked the Chief Deputy.

"Get me the Chief—hurry!"

"What's it about?"

"Good Lord, man—get me the Chief! *I'm Captain Sheffield!*"

The Chief Deputy should be forgiven for connecting him. He was fagged out, and more confusing things had happened lately than he had been fully able to assimilate.

Lazarus spoke first. "Oh, there you are! I've had the damndest time cutting through your red tape. Get me the Old Man, and move! Use your closed circuit."

"What the devil do you mean? Who are you?"

"Listen, brother," spoke Lazarus in tones of slow exasperation, "I

would not have routed through your damned hide-bound department if I hadn't been in a jam. Cut me into the Old Man. *This is about the Howard Families.*"

The Provost was suddenly alert. "Make your report," he said.

"Look," said Lazarus in slow, tired tones, "I know you would like to look over the Old Man's shoulder, but this isn't a good time to start it. If you obstruct me and force me to waste two hours by reporting in corpus, I'll do it. But the Old Man will want to know why, and you can bet your pretty parade kit I'll tell him."

The Chief Deputy decided to take a chance. He could cut him in three-way; if the Old Man didn't burn him off the screen in about ten seconds, then he had played safe and guessed lucky. If he did—well, you could always call it a cross-up in communications.

The Administrator looked flabbergasted when he recognized Lazarus' face in the screen. "You?" he exclaimed. "How on earth— Did Zaccur Barstow—"

"Seal your circuit!" Lazarus cut in.

The Chief Provost blinked his eyes as his screen went dead and silent. So the Old Man *did* have secret agents outside the department, he pondered. Interesting—and not to be forgotten.

Lazarus gave the Administrator a quick and fairly honest account of how he happened to be at large, then added at once, "So you see, I could have gone to cover and escaped entirely. In fact, I still can—the Howard Families' record on me is just a name, and one I don't use in public any more. But I want to know one thing: Is the deal with Zaccur Barstow to let us emigrate still on?"

"Yes, it is."

"Have you figured out how you are going to get a hundred thousand people aboard the *New Frontiers* without tipping your hand? You don't dare trust your own people, you know."

"I know that. The *status quo* is a temporary expediency while we work it out."

"And I'm the man for the job. I've got to be; I'm the only agent in the field for either you or Zaccur. Now listen—"

Eighteen minutes later, Ford was nodding his head slowly and saying, "It might work. It might. Anyway, you can start your preparations. I'll see to it that a letter of credit is waiting for you at Goddard."

"How can I get through to you when I need to call you?" asked Lazarus.

"Oh, that— Note this code combination." He recited it off slowly. "That puts you through to my desk without a relay. No, don't write it down; memorize it."

"And how can I talk to Zack Barstow?"

"Route it through me and I'll hook you in. There is no other possible way, unless you can arrange a sensitive circuit with him later."

"Hm-m-m. I doubt it. I can't be carting a sensitive around with me all the time. Well, cheerio—I'm clearing."

"Good luck!"

ONE hundred thousand people with an average mass of a hundred and fifty—no, make it a hundred and sixty, Lazarus reconsidered—one hundred sixty pounds apiece totaled a mass of sixteen million pounds, eight thousand tons. The *I Spy* could raise such a load against one g, but she would be as logy to handle as baked beans and brown

bread, quite aside from the fact that it was live load and could not be stowed like trade goods for Venus. The *I Spy* could move that many people, all right, but they would all be slightly dead on arrival.

He needed a transport.

Buying a passenger ship big enough to ferry the Families from Earth to where the *New Frontiers* hung in her construction orbit, twenty-five thousand-odd miles from Earth, was not too difficult a task. Four-Planets Passenger Service would sell him such a ship, in all probability. Competition being what it was, they were always anxious to cut their losses on older vessels no longer popular with tourists. But a passenger ship would not do; not only would there be unhealthy interest shown in what he wanted to do with such a ship, but also—and this settled the matter—he could not pilot it single-handed. Under the amended Space Precautionary Act, passenger ships were required to be built for supervised human control throughout, under the theory that no automatic safety device could possibly replace the judgment, the ability to *think*, of a human being.

So passenger ships were out; it would have to be a freighter.

Furthermore, he knew where to find one. Luna City, being a non-self-supporting outpost despite the current attempts of the Department of Bionomics to establish on the Moon an artificial ecological stability, imported from the Earth much more tonnage than she exported. On Earth that would result in a situation of "empties coming back"; in space transport it was frequently cheaper to let some of the empties accumulate, particularly in Luna City, where the empty freighters were quite valuable as scrap

metal, for lunar construction and the fuel required for a return trip was terrifically expensive, since it had to be brought up from Earth.

Lazarus left the communications booth, from which he had talked to Ford, with restrained haste, reclaimed his hired ship, and raised ground at once. He did not know enough of current police practice to be sure whether or not the Chief Provost could or would trace the call he had made, but he wished to cover his tracks as much as possible. He set course due west until the rocket was concealed by clouds at nine thousand feet, then circled a hundred and eighty degrees in the clouds and cut the air for Kansas City. He grounded there, turned in the ship to the local U-push-it agency, and flagged a ground taxi, which carried him down the control-way to Joplin. At Joplin he boarded the local from St. Louis without first obtaining a reservation, which helped to the extent of insuring that his presence on board the rocket would be nowhere officially recorded until the co-pilot finished his run to the coast and turned in his reports.

He left the local at Goddard Field, paid his bills and took possession of the *I Spy*, raised ship for Luna City. He had just completed his solution of a "Hohmann's S"-type trajectory and was feeding the solution into his autopilot when a thought occurred to him: the *New Frontiers* hung in an orbit of no apparent relative motion—that is to say, it had a period of revolution around the Earth of twenty-four hours, being in a circular orbit approximately twenty-six thousand miles from Earth center. She appeared to hang on the local meridian of Goddard Field with a declination of zero.

The time of his take-off was early afternoon; the phase of the Moon

was two days past new—his trajectory would take him very close to the *New Frontiers*.

Why not pay the interstellar ship a call, scout out the lay of the land?

Why not, indeed?

He hummed to himself as he swept the board clear of the calculations he had just so carefully completed and started a new set-up. When the new solution was completed he fed it in, set the entire control board on full automatic, and turned in.

THE ALARM woke him, informing him that his calculated rendezvous had been achieved. He rolled out and peered out the forward ports. There lay the Gargantuan cylinder, dead ahead. He was matched in speed and course, a short leg behind her in their common orbit. But the communication alarm was sounding as well; he shut off both alarms and slapped home the receptor switch. The mechanism hunted and matched frequencies; the visiscreen came to life. "*New Frontiers* calling; what ship are you?"

"Private vessel *I Spy*, Captain Sheffield. My compliments to your commanding officer. May I come inboard to pay a call?"

It developed that they were more than willing to receive visitors. Since the ship was, for all practical purposes, finished, the gang of skilled technicians employed in its construction had already been returned to Earth. There was no one aboard but the inspectors representing the Jordan Foundation and half a dozen specialist engineers, employees of the corporation that had been formed to build and outfit the ship for the foundation. The skeleton crew were bored with each other, bored with the comparative inac-

tivity, and looking forward to the pleasures of Earth.

The senior engineer—technically captain, since the *New Frontiers* was a ship under way—led Lazarus through miles of corridors, pointing out apparatus, storerooms, libraries containing hundreds of thousands of spools, acres of hydroponic tanks, and spacious, comfortable, even luxurious quarters for a crew colony of over ten thousand people. “We believe that the First Expedition was somewhat undermanned,” he said. “The complement for this expedition will be only slightly in excess of the minimum estimate for a colony able to maintain our present level of culture.”

“Doesn’t sound like enough,” commented Lazarus. “Aren’t there more than ten thousand types of specialization?”

“Yes, of course,” agreed the skipper engineer, “but only basic and essential arts will be represented until the colony expands in numbers. Then the reference libraries will enable them to add additional specializations. That is roughly the theory, I believe, though it’s out of my line. Interesting subject, I presume.”

“Are you anxious to get started?” asked Lazarus.

“Get started? Me? Where? Oh, you thought *I* was going to be one of the colonists, didn’t you?” He seemed vastly amused at the idea. “Not for me! I’ve got a little ranch out in San Fernando Valley in California, and that’s where I’m going to spend the end of *my* days, with green sod under my feet and sweet air in my nostrils.” He poked Lazarus in the ribs. “You don’t think the chap that built the *Mayflower* sailed in her, do you?”

Lazarus did not dally in the main-drive space, nor in the cell housing the giant atomic converter, once he

had learned that they were unmanned, full-automatic type. The total absence of moving parts in each of these divisions, made possible by recent developments in parastatics, made their “innards” of intellectual interest only. What he did want to see was the control room, and there he delayed, asking endless questions, until his host was plainly wearied and remaining only out of politeness.

Lazarus finally desisted, not because he minded boring his host, but because he was confident that he had learned enough about the controls to be willing to chance conning her.

Two other important items of information he picked up before he left: In nine Earth days the last finishing touches would be completed. At the end of that time the skeleton crew were planning on a week end of relaxation on Earth, immediately following which the acceptance trials would be held, preliminary to turning her over to the Foundation for her destined service. There might possibly be a communications operator left aboard as a watchman—Lazarus suspected so, but was too wary to be inquisitive on the point—but to all intents and purposes, the big ship would be left empty of life, but in every possible way prepared for interstellar flight. No guard would be left because no guard was imaginably necessary—one might as well guard the Mississippi River!

The other thing that he learned was how to enter the ship from the outside. He learned that from watching the mail rocket arrive just as he was leaving the ship.

AT LUNA CITY, Joseph McFee, factor for Diana Terminal Corp., subsidiary of Diana Freight Lines, greeted Lazarus heartily. They were

old acquaintances. "Come in, captain, and rest yourself! Pull up a chair. No, take this one." He poured two drinks as he talked—honest brown liquor, none of your synthetic surrogates. "Haven't seen you in—well, too long, anyway. Where did you raise from last, and what's the gossip there? Heard any new ones?"

"From Goddard," Lazarus answered, and told him two decidedly vulgar stories, one of which the factor had not heard before. Stories led to politics, and McFee gave Lazarus a detailed account of what he felt to be the solution of the European question, drawing liberally on historical analogy to support his argument. Lazarus gathered that McFee wanted the Federation to establish a protectorate of some sort over the village-and-peasant culture of the ruined continent. McFee had a very involved and semantically weak argument as to why the Covenant could not apply to any territory below a certain level of industrialization.

Lazarus did not give a hoot one way or the other, but it was inexpedient to try to hurry McFee.

But as soon as a graceful opportunity presented itself, he came to the point. "Any company ships for sale now, Joe?"

"Are there? Well, I should hope to shout there are. I've got more iron sitting out there on the plain and cluttering up my inventory than I've had in ten years. Looking for some? I can make you a sweet price."

"Maybe so. Maybe not," Lazarus answered cautiously. "Depends on whether or not you've got what I want."

"I've got it, all right. Never saw such a dull market. Some days a man can't turn an honest credit all

day. Do you know what the trouble is?" he demanded rhetorically. "I'll tell you—it's this Howard Families business. Nobody wants to invest any credit until he knows where he stands. How can a man plan anything when he doesn't know whether to plan for ten years or a hundred? I'll make a prediction: If the Administration manages to crack the secret loose from those babies, you'll see the biggest boom in long-term investments there's been yet. If they don't—well, long-term holdings won't be worth a minim a dozen, and there will be an eat-drink-and-be-merry craze that'll make the Reconstruction look like a kid's party.

"What kind of metal you looking for?" he added, returning at last to the business at hand.

"I don't want metal, I want a ship."

McFee's eyebrows went up. "So? What kind of a ship?"

"Can't say exactly. Got time to look 'em over with me?"

McFee lent him a vac suit. They left the dome by North Tunnel and strolled around the ground ships in the long, easy, loping strides of men used to low gravity. It was soon apparent to Lazarus that there were just two ships available which possessed the requisite lift and air space for his purpose. One was a tanker, gas or liquid, and the more desirable of the two ships, but a quick calculation convinced him that it did not have deck space enough, including the floor plates of the tanks, to permit eight thousand tons of passengers to stand up huddled together, much less lie down for acceleration.

The other was an older ship and had the disadvantage of cranky piston-type injection meters, but she had carried fabricated merchandise and had deck space to spare. Her pay-load lift was much higher than

he needed—it had to be, since a live load would require so much more air space than the merchandise for which she had been built. That would make her lively, which might be important.

As for the injectors, he would nurse them—he had pushed worse junk than this before.

Lazarus haggled with McFee over the terms, not because he had any desire or need to conserve credit, but because he was too shrewd to do anything not in character with his reputation as a sharp businessman. He finally sold the *I Spy* to McFee personally, in a complicated three-cornered deal by which Lazarus accepted McFee's note for the *I Spy*, used it to complete cash payment for the freighter, while McFee was to

receive clear title to the cruiser, which he could in turn mortgage at the Commerce Clearance Bank in Luna City, using the proceeds with some of his own credit to redeem his own note—presumably before his accounts were audited, though naturally Lazarus did not speak of that.

Lazarus knew that McFee wanted a private cruiser of his own, and that he had regarded the *I Spy* as the ideal bachelor's go-buggy. It was not exactly a bribe—not quite. But Lazarus felt reasonably certain that McFee would not be inclined to discuss the deal with anyone. Even so, Lazarus added one more item to confuse the issue; he asked McFee to keep an eye open for a cheap buy in trade tobacco. This McFee agreed to do, having decided quite reason-



ably that the captain's mysterious new venture involved Venus, since that was the only reasonable destination for the goods in question.

It took four days to make the freighter spaceworthy, despite Lazarus' best efforts and liberal bonuses. But at the end of that time he dropped Luna City behind him, owner and master of the *City of Chillicothe*.

Lazarus had already shortened the name to the *Chili* in his mind. That brought dreams of a big bowl of that wonderful vulgar stew, with chunks of meat floating among the red beans—*real* meat, not the synthetic protein pap these youngsters called meat.

He had not a care in the world.

APPROACHING Earth, he called over the patrol frequency and asked for a parking orbit, as he did not wish to set the *Chili* down on Earth. It would waste fuel and might cause talk. To be sure, he could have picked an orbit without permission, but there was a long chance that the *Chili* might be noticed and charted during his absence, and investigated as a derelict. It was safer to be legal about it.

An orbit having been assigned, he attained it and steadied down in the groove. That done, he set the echo mechanism in the ship's communicator to his own combination, made sure that the set in the ship's gig could trigger it, and dropped away in the gig.

He had no particular destination in mind except to locate a public communicator and check in with Zack and the Administrator. He had not dared to do so until he was back on terra, since a ship-to-ground circuit necessitated one step of relay before his call could reach Novak Tower. The custom of privacy

would be no safeguard if the mixer handling the relay overheard him talking to Ford about the Howard Families.

The Administrator answered his call at once, though it was late at night at the longitude of Novak Tower. From the puffy circles under his eyes, Lazarus judged that he had been living at his control desk. "Hi," said Lazarus, "better get me Zack Barstow. I've got some things to report."

"So it's you," Ford said grimly. "I thought you had run out on us. Where have you been?"

"Buying a ship," Lazarus said briefly. "Where did you think? Let's get Barstow."

Ford frowned, but turned to his desk. By means of an auxiliary screen, Barstow joined them in conference. He seemed surprised to see Lazarus, and not altogether relieved. Lazarus spoke quickly:

"What's the matter, pal? Didn't Ford tell you what I was up to?"

"Yes, he did," admitted Barstow, "but he didn't know where you were or what you were doing. As time went along and you didn't check in, I decided that we had seen the last of you."

"Shucks," protested Lazarus, "you know I wouldn't do anything like that. Anyhow, I'm here—and here's what I've done so far—" He told them of the *Chili* and of his visit to the *New Frontiers*. "Now this is how I see it: Sometime between four and six days from now, while the *New Frontiers* is waiting out there with nobody inboard of her, I set the *Chili* down in the prison reservation, we load her up in a hurry, rush out to the *New Frontiers*, take her over, and scoot. Mr. Administrator, that calls for a lot of help from you. You'll have to see to it that your proctors look the

other way when I land and while we load. Then we'll need to kinda slide past the traffic patrol. After that it would be a whole lot better if no naval craft were in a favorable position to do anything drastic about the *New Frontiers*. If there is a watch left on board, they may holler for help before we can shut 'em up."

"Give me credit for some foresight," Ford answered sourly. "I know you will have to have a diversion to accomplish it. The scheme is fantastic as it is."

"Not too fantastic," Lazarus disagreed, "if you are willing to use your emergency powers to the limit right at the last minute."

"No, perhaps not. But we can't wait any four days."

"Why not?"

"The situation won't hold together that long."

"Neither will mine," put in Barstow.

Lazarus looked from one face to the other. "Huh? What's the trouble? What's up?"

They told him.

FORD AND BARSTOW were engaged in an obviously impossible task, that of putting over a complex and subtle fraud, a triple fraud, for the necessary effect was to be different for the Families, the general public, and the Council. Each had a task which presented special and apparently insurmountable difficulties.

Ford had no one at all whom he dared make a confederate; even his most loyal subordinate might be infected by the mania inspired by the delusional fountain of youth. Or might not be—but they were all short-lived individuals, and there was no way to tell without compromising the conspiracy. In the meantime, he had to convince the

Council that the measures he was using were the best possible for achieving the Council's *own* purpose.

Besides that he had to give out daily, almost hourly, statements to the news services, statements intended to convince the citizens that their government was about to be successful in gaining for them the boon of longer lives. As time passed, these statements had to be more circumstantial and detailed. As it was, the populace was becoming restless, impatient, more insistent on immediate results. They were sloughing off their carefully nurtured, gentle culture and becoming *mob*.

Ford had been forced already to resort to the vote of confidence; he had won it by two votes. The Council was getting out of hand.

Barstow's troubles were different, but quite as maddening. He was forced to seek confederates, for the success of the scheme required that all the members of the Families know the truth about what the future held in store for them by some undetermined time before they were ferried to the *New Frontiers*. That was essential, if the Members were to embark quietly and quickly when the time came. He would require group leaders, men influential in their own Families, to persuade, cajole, and quiet fears.

But it was not feasible to tell all the thousands of Members ahead of time. Such a number could not keep a secret; there would be one or more stupid or recalcitrant persons to blab the truth to the proctor guards.

He had picked his men and sounded them out, then taken them into his confidence. They in turn were proselyting others to insure a sufficiently large number of dependable "herdsmen." But with every new man the probability of disaster

increased. It was dangerous—dangerous!

There was another and even more compelling reason why Barstow had to seek confederates. He and Ford had decided on a scheme, fragile at best, to deceive the Council and the public as to Ford's progress in obtaining the "secret." The technique used by the Families in combating the symptoms of senility were being doled out, a little at a time, under the pretense that the sum total was the whole secret of how to live to a biologically impossible age. But to accomplish that meant that Barstow required confederates among the biochemists, gland therapists, specialists in symbiotics and metabolism, and the other skilled technicians who served the kin group in the matter. Once in the conspiracy, Barstow and Ford would see to it that they were questioned by the Chief Provost's psychotechnicians and thereby "reveal" their secrets.

But that required other confederates among the Families' own psychotechnicians in order that the experts picked for the ordeal should be able to maintain the fraud even under the influence of neo-scopolamine or other drugs. They required more than a simple hypnotic injunction not to talk, such as would have served to protect Family secrets at the outset; they required hypnotic false indoctrination for an entire complex of situations—a much more difficult matter—if they were to deceive successfully.

Barstow knew that he could not keep all the elements safely juggled much longer. The other Members, the great mass being kept in ignorance, were increasingly restless; they wanted release from their present uncomfortable and humiliating predicament, and they expected anyone

in authority to *do* something—and quickly!

Barstow saw his influence with his cousins shrinking like snow in a chinook.

"IT WON'T BE any four days," repeated Ford. "It will be twelve hours—twenty-four at the outside."

Barstow looked worried. "I don't know whether I can prepare them in that length of time. I may have trouble getting them to go."

"Don't worry about it," Ford said shortly.

"Why not?"

"Because," he said bluntly, "anyone who stays behind will be dead ten minutes after you raise ship!"

Barstow said nothing, but looked at Ford with eyes filled with unresentful pain. It was the first time that either one of them had admitted verbally what each knew to be true—that this was no relatively harmless piece of involved political chicanery, but a desperate and almost hopeless attempt to escape execution—and that Ford stood in the anomalous and excruciatingly embarrassing position of being both conspirator and executioner.

Quickly they both dropped their eyes and looked away.

"Well," Lazarus broke in briskly, "now that you boys have settled that little item, let's get on with it. I can ground the *Chili* in"—he considered rapidly where she would be in her orbit, and how long it would take him to rendezvous in the gig—"sixteen hours. Play safe and make it seventeen. How about nineteen o'clock, zone plus six time, tomorrow afternoon?"

The other two showed relief at his apparent tactlessness. "Good enough," agreed Barstow. "I'll have them in the best shape possible."

"You can tell them all any time

now," Ford confirmed. "I am withdrawing all proctors at once." Barstow understood that Ford did not mean that the Families were to be released; the temporary barrier which imprisoned them would be left in place, but they would be completely cut off from contact with the short-lived. He could drop the difficult and nerve-racking subterfuge to his own people.

"Anything else before we clear?" asked Lazarus. "Oh, yes—Zack, we'd better arrange a place for me to ground, or I may shorten a lot of lives with my blast."

"That's true. I've planned on it. Make your approach from the south. I'll have your berth marked in the usual fashion."

"Better give him a pilot beam to come in on, too," Ford warned.

"Why?" asked Lazarus. "I don't need one. I could set her down on the top of the Washington Monument."

"Not tomorrow night you couldn't. Don't be surprised at the weather."

LAZARUS approached his estimated rendezvous with the *Chili* and used the little communicator in the gig to buzz the combination he had set on the echo device in the mother ship. He heard the answering signal at once, which relieved his mind, for he had very little faith in machinery which he had not personally overhauled. A long search for the *Chili* at this point could be disastrous.

He cut in her bearing, picking up the signal by radio compass, swung wide, cut her again, swung high and cut a third time to prove his fix, and then gunned the little craft for home. He had missed his rendezvous by less than three minutes—not bad in

a heavy field with a freighter's barely adequate instruments.

Entering the stratosphere, circling two thirds of the globe to ground, took no more time in the *Chili* than he had anticipated. The hour's leeway he had allowed himself he partly expended by being stingy in his maneuvering in order to spare the worn, obsolescent injection meters.

Then he was down in the troposphere and making his approach. He soon realized what Ford had meant in warning him about the weather. His destination was covered with thick, deep clouds. Lazarus was amazed at the size of the disturbance and somehow pleased. It reminded him of other days, when weather was something to be experienced rather than to be planned. Life had lost some of its flavor, in his estimation, when the electronics engineers had finally harnessed the elements. He hoped that the planet they finally found—if they found one!—would have some nice, lively weather.

All at once he was in it and too busy to meditate about it. In spite of her mass, the ship bucked and complained. Whew! Ford must have ordered this little charivari the minute he set the time—and at that, the integrators must have had a big, natural low-pressure area somewhere out over the Gulf to build on. He switched on his infrareds and cut in the rectifiers, putting him in visual contact again through the ghostly images on the black-light screen.

He passed over a miles-wide scarred band on the landscape, unmistakable even with the infra—the ruins of the Okla-Orleans road city. When Lazarus had last seen it, it had been noisy with life. Of all the unwieldy, cantankerous white elephants the race had ever saddled itself with, he thought with the unused half of his mind, those mechani-

cal monstrosities easily took first prize!

The thought was cut short by an urgent signal from his board; he had picked up Barstow's pilot beam.

He wheedled her in, cut his last jet as she scraped, and slapped a series of levers; the great cargo ports rumbled open, and the rain beat in.

ELEANOR JOHNSON huddled into herself, half crouching against the storm, and tried to draw her cloak more tightly about the baby in the crook of her left arm. The child had cried when the storm first hit, cried incessantly, stretching her nerves tight. Now it was silent, but its silence seemed only new cause for alarm.

She had wept herself, though she had tried not to show it. In all her twenty-seven years, she had never been exposed to a storm like this; it seemed symbolic of the storm that had overturned her life, swept her away from her beloved first home of her own with its homely, homey, old-fashioned fireplace, its shiny, efficient service cell, its own thermostat which she could set to the temperature *she* liked, without consulting others—a storm which had swept her away between two grim proctors, arrested like some poor psychotic, and landed her after terrifying indignities here in the cold, sticky red clay of this Oklahoma field.

Was it true? Could it be true? Or had she never borne the child in her arms at all, and this another of the strange dreams she had had while she carried it?

But the rain was too real, too coldly wet, the thunder too loud. She could never have slept through such a dream. Then what the senior trustee had told them must be true, too. It must be true; she had seen the ship ground with her own eyes,

its blast bright against the gloom of the storm. She could not see it now, but the crowd around her moved slowly forward from time to time, as those ahead loaded. She was close to the outskirts of the crowd; she would be one of the last to get aboard.

It was very necessary to get aboard; Zaccur Barstow had told them with deep solemnity what lay in wait for them if they failed to board. She had believed him; nevertheless she wondered how it could possibly be true—how could anyone be so wicked, so deeply, terribly wicked as to kill anyone as harmless and helpless as herself and her baby?

She was struck by sudden panic, terror—suppose there was not *room* enough by the time she got up to the ship? She clutched the infant more tightly to her breast. The child cried again at the pressure.

A woman in the crowd moved closer and spoke to her. "You must be tired. May I carry the baby for a while?"

"No. No, thank you. I am all right." A flash of lightning illuminated the features of the woman who had offered; she recognized her and recalled her name; it was Mary Rising.

But the kindness of the offer steadied her. She knew now what she must do. If they were filled and could take no more, she must pass the child forward, over the heads of the crowd. They could not refuse space to anything as little as her baby.

Something brushed her in the dark. The crowd was moving forward again.

WHEN BARSTOW could see that the loading would be completed in a few more minutes, he left his post by one of the cargo ports and ran as

fast as he could through the splashing, sticky muck to the communication shack. Ford had instructed him to give notice just before they raised ship; it was necessary to Ford's plan of diversion. He fumbled with the awkward, unpowered door, swung it open, and rushed in. He set the private combination that should connect him directly to Ford's control desk and pushed the activating key.

He was answered quite promptly, but it was not Ford's face on the screen. He stared blankly and burst out with, "Where is the Administrator? I want to talk to him," before he placed in his mind the face in front of him.

It was a face well known to the public through sterocast and picture—the Leader of the Minority in the Council.

"You're *talking* to the Administrator," the man said, and grinned savagely. "The *new* Administrator. Now who the devil are you?"

Barstow thanked all gods, past and present, that the recognition was one-sided. He cut the circuit with one unaimed blow at the control panel and plunged out of the building.

Two of the ports were closed; the last stragglers were moving into the others. He urged them in with curses and slammed pellmell up the central lift to the control room. "Raise ship!" he shouted to Lazarus. "Fast!"

"What's all the shootin' fer?" inquired Lazarus, but he was already busy with his hands at the levers which closed the ports. He tripped the screamer which warned of acceleration, waited a scant ten seconds, and gave her *power*.

"Well," he said conversationally a few minutes later when the pressure across their chests had relaxed sufficiently to permit comfortable speech,

"I hope everybody was lying down. If not, we may have some broken bones on our hands. What was that you were saying?"

Barstow told him about his attempt to report to Ford.

Lazarus whistled a few bars of "Turkey in the Straw." "It looks like we've run out of minutes. It does look like it." He made no further comment of any sort, but gave his attention to nursing greater speed, one eye on the fuel gauge, one on the tracker.

LAZARUS had his hands full to jockey the *Chili* into just the right position under the belly of the *New Frontiers*; the overstrained meters made the smaller craft skittish as a young horse. But he did it. The magnetic anchors clanged home; the gas-tight seals slapped into place; and their ears popped slightly as the smaller ship adjusted its internal pressure to that of the larger. Lazarus dived for the drop hole in the floor and, pulling himself rapidly hand over hand, reached the port of contact in time to find himself face to face with the skipper-engineer of the *New Frontiers*.

"What's the meaning of this?" he was asked angrily. "Where do you think you are? In a public zoo?"

"It means," said Lazarus, "that you and your boys are going back to Earth a few days early—in this ship."

"Why, that's ridiculous!"

"Brother," said Lazarus gently, his blaster suddenly growing out of his left fist, "I'd sure hate to kill you after you were so nice to me, but I sure will, unless you knuckle under awful quick."

The official seemed undecided. One of his subordinates, of a group which had gathered to learn the cause of the unexpected arrival, at-

tempted to slip away. Lazarus winged him in the leg, at low power, with a deceptively casual shot from the hip. "Now you'll have to carry him," he observed.

That settled it. The skipper made use of the big ship's internal announcing system from the microphone located at the open port to call all his men together. Lazarus counted them as they arrived—twenty-nine, a number he had been careful to learn on his previous visit. As each arrived, two men were assigned to hold him, in lieu of weapons or handcuffs.

In the meantime, the *Chili* was being slowly emptied. Only the one port of four could be used, but it was being used much more rapidly. In zero gravitation, the bodies boiled out of the trunk connecting the two ships like angry bees from a hive, the pressure of the uneasy mob behind forcing those in the bottleneck through rapidly. Barstow had joined Lazarus as soon as he had been able to work his own way through the press. Lazarus set him to attempting to bring some degree of order into the proceeding, order which would hasten the finish. More assistants were conscripted from the flowing throng, largely for their apparent immunity to spacesickness, and stationed as monitors to keep the crowd moving on into the ship.

A man broke loose from the stream and approached Barstow. "There's someone trying to get into the freighter," he announced. "I saw them through a port."

"Where?" demanded Lazarus.

The man was handicapped somewhat by a defective knowledge of ship structure and terminology, but he managed to make the location clear. "Hang onto those babies," Lazarus advised the guards holding the prisoners. He returned his

blaster to its holster and fought his way back into the *Chili*.

There was a ship, true enough, as Lazarus determined by peering cautiously out a viewport—a small yacht for one or two passengers. Its occupant or occupants had sealed to an entrance lock and was trying noisily but vainly to open the locked door.

Lazarus got both his weapons free, then kicked the latch open with a foot and jumped to one side.

The door opened and a single figure emerged. Lazarus surveyed it cautiously from his vantage, then moved out into view. "I'll be a cross-eyed so-and-so!" he said feelingly. "It's you, eh?"

"Yes, it's me," admitted Slayton Ford. "May I . . . may I come along?"

He had not only lost his office, he had barely escaped arrest. Knowing what was bound to come out, he had made a last-minute decision to come along if they would have him, rather than go to Coventry—or worse.

It was certain aspects of the diversion he had arranged which had finally brought on his downfall. Withdrawing the proctors was suspicious enough, arranging the storm was worse, although he had called it an attempt to break down the morale of the prisoners—but the steps he had taken to insure that naval vessels were grounded or remote in space had in the final instance tripped him up.

For he had, at the last moment, caused a broadcast warning to be sent out which alleged that one of the uranium power plants swinging in orbits about the Earth had been attacked by pirates. The plant named in the call was at the time on the side of the Earth farther from the *New Frontiers*.

It was a thin excuse at best—fishy

—but it bore official authority, and had sufficed to draw all police and naval craft to the far side of the planet.

It was simply bad luck that his political rival should have caught him out on it so soon. An emergency session of the Council was convened at once; Ford was ousted as soon as a quorum could be assembled.

LAZARUS CONDUCTED Ford back into the *New Frontiers*, and paused in front of Barstow. "Yeah, it's him," he confirmed. "Don't stare—it's rude. He's going with us. Have you seen Libbey?"

"Libbey? Yes, he came through just a short while ago. He's around close, I think, for he was looking for you."

"Good. I want him. How much longer till you're loaded?"

"God knows. Not more than an hour, I'd guess, but we could not count them."

"O. K. I'm going up to the control room. We ought to be shoving out of here a little sooner than is humanly possible. Phone me as soon as you have the last man in, our guests here out, and the *Chili* broken clear. And send Libbey up."

"Lazarus—"

Lazarus swung around. It was Libbey. He had a small portmanteau strapped to his wrist.

"Oh, there you are! Come on, Andy. We are going up to Control."

"All right, but I wanted to tell you—"

"We'll talk later." He motioned for Ford to come along, partly because he did not know what else to do with him and partly with a vague idea of keeping him in sight and away from the mass until his presence on board could be explained in the most favorable fashion.

Lazarus spent the enforced wait

while loading was being completed in explaining to Libbey the extremely ingenious but entirely unorthodox controls of the star ship. Libbey was fascinated, delighted, and forgot to bring up the matter that was on his mind. As for Lazarus, he was pleased to be able to instruct at least one relief pilot before moving out. Barstow's call announcing all clear came before Lazarus had gotten around to picking a course.

"I guess we had better head straight out away from Earth first," he said, speaking half to himself, "since our pal Ford has drawn the navy and patrol craft off to the far side."

"No, Lazarus, no!" protested Libbey.

"Huh? Why not?"

"You should head right straight for the Sun—"

"For the Sun? Why?"

"I tried to tell you. It's because of the space drive you asked me to develop."

"But we haven't got it."

"Yes, we have. Here." He shoved the valise he had been carrying toward Lazarus.

Lazarus opened it.

Assembled from odd bits of other equipment, looking more like the product of a boy's workshop than the output of a scientist's laboratory, the gadget which Libbey had referred to as a "space drive" underwent Lazarus' critical examination. Against the polished and sophisticated perfection of the control room it looked uncouth, pathetic, ridiculously inadequate.

Lazarus poked it tentatively. "What is it?" he asked. "Your model?"

"No, no. That's *it*. That's the space drive."

Lazarus looked at the younger man critically, but not unsympa-

thetically. "Son," he asked slowly, "the strain hasn't been too much for you, has it? You haven't come unzipped?"

"No, no, no!" Libbey sputtered. "I'm as sane as you are. This is a radically new notion. This is why I want you to take us down toward the Sun. If it works, it will work best where light pressure is strongest."

"And if it doesn't work," inquired Lazarus, "what does that make us? Sunspots?"

"I don't mean for you to drive straight *into* the Sun. Head for it now, and as soon as I can work out the data, I'll give you the corrections to warp into your proper trajectory. I want us to pass the Sun in a very flat hyperbola, well inside the orbit of Mercury, and as close to the photosphere as this ship can stand. I don't know how close that is, so I couldn't work it out ahead of time, but the data must be available on board, and there will be several hours in which to correlate it."

Lazarus looked again at the giddy little cat's cradle of apparatus, then back at its designer. "Andy," he said, "if you are sure that the gears in your head are still meshed, I'll take a chance on it." He shoved out his left hand in a sudden decisive gesture, covering a small ruby of light on the left-hand control panel; the acceleration warning shrieked throughout the ship. "Anyhow," he added cheerfully, "if they try to catch us, they won't like chasing us down into the Sun!"

He started easily with a quarter g, just enough to shake them up and make them cautious. He raised it to a half g, to a g, and held it there for a few seconds. "They all should have had time to lie down by now," he commented, and raised it again—

three halves g. When the acceleration reached twice that of gravity, Earth normal, he held it. With thousands of groundlubbers aboard, he was reluctant to increase the acceleration above that point for any sustained period—even two g's might put too much of a strain on some of them.

To be sure, many of the naval craft he was trying to outrun could accelerate higher than two gravities, and their crews could stand up physically under much more for short periods. But a naval vessel's period of high acceleration was strictly limited by her fuel tanks.

The *New Frontiers* had no fuel tanks; she "lived off the country," gathering up any mass that lay in her path with a sweep field—meteors, cosmic dust, stray atoms. If the "country" was "poor" in stray matter, any mass from within the ship was fuel for her hungry converter—furniture, clothing, food, even dead bodies. The converter accepted them all—mass was energy; energy, mass. Each tortured gram, in-dying, gave up nine hundred million *trillion* ergs.

LAZARUS PUT the acceleration up to two g's and held it, using it first to kill the vector sum of the *New Frontiers*' orbital speed plus the orbital speed of the Earth—a trifle over forty-eight miles per second, and none of it in the direction he wished to go. Even at two g's, it took more than an hour. Had he known his destination and been able to pick his time—twelve hours' sidereal earlier or later—he could have made use of the orbital speed of the *New Frontiers*. He shrugged it off—spilled milk. Pursuers would probably be under the same handicap, since they would naturally use the vector of the *New Frontiers* as a

prime factor in their calculations—he hoped.

Libbey made a half-hearted attempt to use the unfamiliar ballistic calculators of the big ship, unfamiliar in that they, like everything else in the ship, were built without moving parts. He soon gave it up and fell back on the curious talent for figures lodged in his brain. His brain had no moving parts, either, but he was used to it.

When Libbey had provided Lazarus with the data and Lazarus had settled the ship into her course, he checked for pursuers again—as well as he could, which was not too well. None of the usual detection devices, magnetic, radio, nor klystron, could be very useful to him, not because they would fail to show him ships, but because they would fail to show him *what* ships. Naturally, as close to Earth as he still was, there would be ships, but the instruments had no way to distinguish between a navy interceptor and a helpless cruiser.

The *New Frontiers* had one more resource not found on normal ships.

Her control room was located inside the ship instead of in the bow, and was hemispherical in shape, with the controls at the center of the flat side. Her only predecessor in interstellar flight, the *Vanguard*, had been fitted with a spherical control room; the inner surface of the sphere being equipped in the conventional manner with vision screens which reproduced the entire celestial globe—a stellarium. But men are so equipped as to see but one hemisphere at a time, an entire sphere was unnecessary. The hemisphere in the *New Frontiers* reproduced either the leading or the trailing hemisphere, as might be selected by the pilot, by the simple dodge of using

unparalleled circuits throughout the new system.

But electromechanical vision has an advantage over bare sight; it is potentially able to discern lower angular speed than the eye. To the eye, a spaceship any distance away is a dot of light, and all dots of light differ only in intensity, be they stars or spaceships. If the relative angular speed of a ship against the stars is low, the eye will miss it. But an instrument can be designed to detect it. The delayed-action stereoscopic principle, long used in naval range finders and in asteroid-belt pilot alarms, had been built into the entire spread of view screens. If a dot of light reproduced on a screen declined to hold steady, but progressed from cellet to cellet—relative angular movement—the gradient so established would trigger a circuit causing the moving dot to far outshine its fellows, and with a color which ran down the spectrum according to the angular speed. All this if the pilot threw in the proper test circuit.

Lazarus threw in the circuit. The high speed of the *New Frontiers* gave a long, effective base line for the pseudo-stereoscopy. Half a dozen dots of light obliged by glowing angry red, several times that number in other colors. He disregarded the rest, examined the half a dozen, running up the electronic magnification to the limit. None of them appeared to be on courses which would cross their own course ahead of them, or at all, for that matter.

He dropped the matter. He still had no information as to ships which might be attempting to intercept them directly, since a ship on a collision course holds a steady bearing, but he was not much worried about that. At two g's, a naval ship would

burn up her fuel before reaching them, he judged. If they were fools enough to risk dropping into the Sun, let 'em come on!

Tabling the matter in his mind, he turned to Libbey. "I could do with some coffee and some sandwiches. How about you?"

Libbey nodded absent-mindedly. Ford spoke up, the first word he had uttered since entering the ship. "I can get it," he said eagerly. He seemed pathetically anxious to be useful.

"O. K. No, you'd probably get into some kind of trouble. You aren't exactly popular with the Members. I'll phone down and raise somebody."

"I probably wouldn't be recognized under these circumstances," Ford argued. "Anyhow, it's a legitimate errand—I can explain that."

Lazarus saw from his face that it was necessary to the man's morale. "All right," he capitulated, "if you can handle yourself under two g's—"

"I've got space legs. What kind of sandwiches?"

"I'd say corned beef, but it would probably be some kind of damned substitute. Make mine cheese, with rye if they've got it, and use plenty of mustard. And a gallon of coffee. What are you having, Andy?"

"Me? Oh, anything—whatever is convenient."

Ford heaved himself out of the acceleration chair he had made use of and started to leave, then added, "Oh—it might save time if you could tell me where to go."

"Brother," said Lazarus, "if this ship isn't pretty well crammed with food, we've all made a terrible mistake. Scout around—you'll find some."

Down, down, down toward the Sun, with a speed increasing by

sixty-four feet per second for every second elapsed. Down, and still down, for fifteen endless hours of double weight. They had traveled seventeen million miles and reached the inconceivable speed of six hundred and forty miles per second. Oh, yes, the figures can be spoken—but try to imagine New York to Chicago, an hour's flight in the best stratorocket, done in the flutter of a heartbeat.

They approached the orbit of Venus, would reach it before a man could grow hungry. At the end of the fifteenth hour Libbey, then at conn, ceased accelerating, let the ship fall free under her terrific impetus and the steadily mounting pull of the Sun.

Barstow had had a bad time of it during the fifteen hours of heavy weight. For the rest, it was a time to lie down, to try hopelessly for sleep, to breath laboriously and to seek a new position in which to rest from the burden of their own bodies. But a sense of responsibility drove Zaccur Barstow on, though the Old Man of the Sea sat around his neck and raised his weight to three hundred and fifty pounds.

Not that there was anything much he could do for them, save crawl ponderously from one compartment to another and inquire about their welfare. Organization, assignment of sleeping spaces, arrangement of routine and duties, all those things must wait until the pilots decided to cease accelerating. In particular, nothing could be done to change at all the manifold overcrowding of the ship. They lay where they had to, men, women, children mixed indiscriminately together, without room to stretch out properly.

The one good thing about it, Barstow reflected, was that they were all too weary, too miserable to worry

about more than the dragging minutes. There was no spirit in them to make trouble, to question the wisdom of the flight, to inquire into the many unexplained and contradictory factors leading up to it—or such embarrassing details as Ford's presence aboard, or the peculiar actions of Lazarus.

He must, he thought, plan a careful propaganda campaign before such questions could grow.

Eleanor Johnson felt none of these worries. After the first relief of realizing that her baby and herself were safe in the ship, she resigned her worries to her elders, and felt nothing but the dull apathy of emotional reaction and inescapable weight. Her child was quiet, whether in a coma or sleeping, she could not tell. She listened for its heartbeats and assured herself that it was alive; beyond that there was nothing that she could do—now.

She did not even raise up her head when Barstow plodded through the compartment in which she lay.

Free flight should have been a relief. It was not, save for the minuscule percent who were old spacemen. There is no need to dwell on the unsavory horrors of spacesickness. Infinity multiplied by anything is still infinity. A hundred thousand cases of nausea is still nausea. Those who have experienced it in space or at sea know of it; those who have not cannot be told of it.

Barstow, himself long since salted to free flight, floated forward to the control room to pray for relief for his charges. "Most of them are terribly uncomfortable," he told Lazarus. "Can you put some spin on the ship and give them a little let-up? It would help a lot."

"And it would make maneuvering difficult. No." He added not unkindly, "A ship that is quick to re-

spond will mean a lot more to them if it comes to a pinch than just being able to keep their supper down. Nobody ever dies from spacesickness, anyhow—they just wish they could!"

LATE on the second "day" out, when the ship was already inside the orbit of Mercury, Libbey returned to the control room, having taken some overdue rest. Lazarus turned the conn over to him with the remark, "Better look the situation over, Andy. I had some trouble while you were gone."

"What kind?" Libbey demanded anxiously.

"Now just hold your speed. I tried to call you, but nobody seemed to be able to dig you out. Some red lights showed up."

"Naval craft?"

"Seems so. They weren't following reasonable commercial trajectories. As I figure it, our pal, the new Administrator, hollered for help to Venus, and they gave it to him—just a friendly gesture of interplanetary good will!" he added dryly.

"What happened?"

"Mine-laying maneuvers ahead of us. As near as I could tell from their numbers and courses, they were lacing space with the thickest case of smallpox they could manage—an all-out job."

"So?"

Lazarus shrugged his shoulders. "I had to duck. I had to duck the only way they left open—closer to the Sun."

The Sun is not a large star, as stars go, nor very hot. It is just that it is hot with reference to men. Hot enough to strike them down dead ninety-two million miles away if they are careless about remembering to wear hats in tropic noonday. Hot enough that mankind, reared

under its rays, dare not look at it with bare eyes.

At a distance of two and one half million miles, the Sun beats out with a glare fourteen hundred times as bright and as hot as the hottest ever endured in Death Valley, Zanzibar, or the Sahara. And that is another incommensurable—such radiance would not be perceived as heat nor light; it would be death more sudden than the full power of a blaster.

It was hot inside the ship. The passengers had the relief of pseudo-gravity now, for Lazarus had to spin the ship to permit some little of the flood of radiant energy to re-radiate from the "cold" side. The outer walls of the ship were built as a grid of thermo cells for the purpose of absorbing and storing unwelcome energy, but they were not built—could not be built—for any such load as this. Heat must go somewhere.

It was hot in the control room. An enormous circle of blackness marked the place where the image of the Sun should have stood on the hemisphere of the stellarium; the screens automatically cut out in the face of such a ridiculous demand.

When Lazarus spoke it was to repeat the last words Libbey had uttered:

"'An hour and thirty-seven minutes to perihelion.' We can't take it, Andy. The ship can't take it."

"I know. I never intended for us to pass this close."

"Of course you didn't. Maybe I shouldn't have maneuvered. Maybe we would have missed the mines, anyhow. Oh, well—" He squared his shoulders and consigned the subject to the realm of might-have-beens. "It looks to me, son, like it was about time to try out your gadget." He poked a thumb in the general direction of Libbey's un-

couth-appearing space drive. "How does it work, now? You say that all you have to do is to hook up this one connection?"

"That is what is intended. The one lead to any portion of the mass it is to affect. Of course, I don't *know* that it will work," he admitted. "There was no way to test it."

"Suppose it doesn't?"

"There are three possibilities," Libbey answered methodically. "In the first place, nothing at all may happen. In the second place, we and the ship may cease to be matter as we know it—"

"Dead, you mean."

"Yes, I suppose so. In the third place, if my hypotheses are justified, we will recede from the Sun at a speed just under that of light."

Lazarus eyed the gadget and wiped at his bare shoulders. "It's getting hotter, Andy. Hook it up—and it had better be good!"

Libbey hooked it up.

"GO AHEAD," urged Lazarus. "Finish it. Push the button, throw the switch, cut the beam. Make it march."

"I have," Libbey insisted. "Look at the Sun."

"Huh? Oh!" The great circle of blackness which had described the relative position of the Sun on the star-speckled surface of the stellarium was shrinking visibly. In a dozen heartbeats it lost half its diameter. Twenty seconds more and it had shrunk to a quarter of its original width.

"It worked," said Lazarus softly. "Write me down for a Chinaman—it worked!"

"I rather thought it would," Libbey answered seriously. "It should, you know."

"Hm-m-m. That may be evident

to you, Andy. It's not to me. How fast are we going?"

"Relative to what?"

"Relative to the Sun."

"I haven't had opportunity to measure it yet, but it seems to be just under the speed of light. It can't be greater."

"Why not—aside from theoretical considerations?"

"We still see." Libbey pointed to the stellarium ceiling.

"Yeah, I suppose so," Lazarus mused. "Say, wait a minute. We ought not to be able to—Doppler's effect."

"That is *odd*," Libbey agreed. "One would think that the Sun's light would have been shifted clear out of the visible spectrum. No. No, of course not, shorter radiation would simply replace it, in so far as the vision-screen receptors are concerned. I should judge that we are 'seeing' by means of the shortest and hardest of the Sun's radiation—shorter than anything we normally have the means to detect."

"It sounds good," said Lazarus, "the way you tell it. I'll believe anything right at the moment. Anybody that wants to dispose of an option on lunar green cheese will find my sales resistance awful low."

Libbey smiled politely and bent over his space drive. "We might as well return to normal operation," he said, and moved as if to disconnect.

Lazarus stopped him hastily. "Hold it, Andy! We aren't even outside the orbit of Mercury. Why put on the brakes?"

"Why, this won't stop us. We have acquired a speed; now we will hold it."

Lazarus pulled at his cheek and stared at nothing. "Ordinarily, I would agree with you. First law of motion. But with this pseudo-speed I'm not so sure. We got it for noth-

ing and we haven't paid for it—in energy, I mean. You seem to have declared some sort of holiday with respect to inertia; when the holiday is over, won't that free speed go back where it came from?"

"No, I don't believe so," Libbey countered. "This velocity isn't pseudo anything; it's real as velocity can be. You are attempting to apply verbal anthropomorphic logic to a field in which it is not pertinent. You would not expect us to be translated instantaneously back to the lower gravitational potential from which we started, would you?"

"Back to where you hooked in your space drive? No, we've moved."

"And we will keep on moving. The acquired gravitational potential energy of greater height above the Sun is no more real than the acquired kinetic energy of velocity."

Lazarus looked baffled. The expression did not seem to suit his features. "It looks like you've got me, Andy. No matter which way you look at it, we seem to have picked up energy from nowhere. I don't get it. Where I went to school they taught me to honor the flag, vote the straight party ticket, and to believe in the law of conservation of energy. Seems like you've violated it. How about it?"

"I wouldn't worry too much about it," suggested Libbey. "The so-called law of conservation of energy was a working hypothesis, unproved and unprovable, used to describe a number of gross phenomena. Its very terms were applicable only to the older dynamic concept of the world. In a plenum, conceived as a static grid of relationships, a so-called violation in the law of conservation of energy appears as nothing more startling than a discontinuous function, to be noted and

described. That's what I did; I saw a theoretical possibility of a discontinuity in the aspect of mass energy called inertia. I applied it."

He reached over and disconnected his apparatus.

Nothing happened. The disk of black continued to shrink. When its diameter had decreased to approximately one sixth of its former maximum—almost ninety seconds after the inception of the space-drive effect—it suddenly changed from black to shining white. The ship had receded to a sufficient distance from the Sun for the vision screens again to handle the load of its brilliance.

Lazarus said nothing. He was trying to work out in his head the kinetic energy of the ship—one half of the square of velocity of light times the mass of the ship. The answer did not comfort him, whether he called it ergs or apples.

"FIRST things first," said Zaccur Barstow. "I am as much interested in the startling scientific aspects of our present situation as any of you, but we have got to work out some pattern of daily living. Let's table mathematical physics and talk about organization."

He was speaking to his "brain trust"—not the trustees, but his key personnel in putting over the events leading up to the flight in the *New Frontiers*—Ralph Schultz, Eve Barstow, Mary Risling, Justin Foote, Clive Johnson, several others. Lazarus and Slipstick Libbey were both there; the control room had been left manned only by Slayton Ford—not that he was to touch the controls; he had been given the token task of seeing to it that no one else touched them; that being Lazarus' notion of *ad interim* occupational therapy.

Lazarus had seen, or sensed, in

Ford a mental condition which Lazarus did not like. He was no psychologist, but the gross symptoms of a situational psychosis he felt to be present.

"We need an executive," continued Barstow. "Someone who, for the time being, at least, will have extensive authority to make decisions, set up an internal organization, give orders, and have them carried out. I would like to have our brethren hold an election and do the task democratically, but the work to be done is too urgent. Democracy will have to wait on expediency."

"It seems to me," said Eve Barstow, "that the thing to do is to put it up to the trustees. We were an emergency group; the situation that called us into being no longer obtains."

"Ahrmmph—" It was Justin Foote, in tones as dry and formal as his face. "I differ somewhat from our sister. The trustees are not conversant with the full background; we would have to spend time in bringing them up to date, as it were, before they would be able to judge the matter. Furthermore, as one of the trustees, I think I speak without prejudice when I state that the trustees, as an organized group, have no jurisdiction. Legally, they do not exist."

"How do you arrive at that, Justin?" Lazarus asked with interest.

"Thus: The board of trustees were the custodians of a foundation which existed with relation to—in apposition to—a society. They were not a government; their duties had to do solely with the relations between the Families and society. With the ending of the relationship between the Families and terrestrial society, the board of trustees, *ipso facto*, ceases to exist.

"We in this ship are not yet a so-

ciety, we are an anarchistic group. The present assemblage has as much—or as little—authority to initiate a society as any part group."

Lazarus applauded. "Justin," he approved, "that is as neat a piece of verbal juggling as I have heard since I was a kid. Let's get together sometime and have a go at solipsism."

Justin Foote looked vexed. "Obviously—" he began.

"Nope! Not another word," Lazarus interrupted; "you've convinced me. Don't spoil it. If that's how it is, let's get busy and pick a bull moose. How about you, Zack? You look like the obvious candidate."

Barstow shook his head. "No. I don't know enough about such things, and I know that I don't. I am no sociologist. The Families were a hobby with me, but I am an engineer, not an expert in social administration."

When he had convinced them that he really meant it, other candidates were suggested and their qualifications debated—extensively. In a group as large as the Families there were many who had specialized in political science, many who had served with credit in public positions.

LAZARUS CALLED Eve Barstow aside and whispered with her for several minutes.

Eve Barstow asked for the floor. "I have a candidate to propose," she began in her usual gentle tones. "One who would not ordinarily occur to you, but who is incomparably better fitted, by temperament, training, and experience, to do this job than anyone yet proposed.

"For civil administrator of the ship I nominate Slayton Ford."

For some minutes no one seemed able to speak, then they all tried to talk at once. "What's happened to

her? Ford's back on Earth!" "No, he's not—he's *here*—in the ship. But it's out of the question!" "It wouldn't work." "The Families would never accept him." "Even so, he's not one of us."

Eve patiently kept the floor until they had quieted down. "I know my proposal sounds ridiculous and I admit there are difficulties. But there are great advantages. You all know Slayton Ford by reputation and performance. You know, and every member of the Families knows, that Slayton Ford is a true genius in the field of society relationships. It will be hard enough to work out plans for living together in this badly overcrowded ship; the best talent we can get will be no more than enough."

Her words carried weight; Ford was that rare thing among statesmen, a man whose worth was universally acknowledged during his own term of office. Current historians credited him with having nursed the Western Federation through two of its development crises. That events should have faced him with a social conflict not solvable by any ordinary means was his misfortune rather than his failure.

"I agree with you," observed Zaccur Barstow, "in your opinion of Ford's ability, and, for myself, I would be more than willing to accept his administration. But we must remember that Ford embodies to every Member but ourselves the persecution which has made them refugees. It seems to me that that makes him an impossible candidate."

"We have already agreed," answered Eve, "that we must undertake an indoctrination campaign to render palatable a number of embarrassing facts about the events of the past few days. It seems to me possible to include therein the idea that Ford is a martyr who sacrificed him-

self to save our lives."

"Perhaps you are right; it is beyond my ability to determine. He was, indeed, a martyr, though not entirely in our behalf. But I must ask for expert opinion. How about it, Ralph? Could it be done?"

Ralph Schultz considered his answer before replying. "The truth or falsity of a proposition has nothing to do with its psychodynamic aspects. The proposition concerning Ford does not jibe with the indoctrination program I had prepared, but I believe that a new schedule could be worked out to include it. The proposition has certain sentimentally dramatic qualities about it which lends it to manipulation, even though it must be launched in the face of a strong counterproposition."

"How long will it take to establish it?"

"Well, I could prepare a suitable set of rumors in an hour or two. I would want to launch them at once, since I am almost without data as to the spontaneous rumors which are current in the ship. I can only estimate the speed of propagation in an unsurveyed field such as this, but you should be ready for public announcements by tomorrow."

Schultz's sanguine outlook convinced the rest. On Barstow's suggestion, Lazarus phoned Ford and told him to come aft to the meeting place.

LAZARUS had not explained to him why his presence was required. He entered the compartment like a man come to judgment, come with a bitter certainty that the outcome will be against him. His manner showed fortitude, but not hope. His eyes were unhappy.

Lazarus had studied those eyes during the fifty hours and more that they had been shut up together in

the control room. They bore an expression that Lazarus had seen before several times in his long and varied life.

The condemned man who has lost his final appeal, the fully resolved suicide, little furry things exhausted and defeated in their struggles with the unrelenting steel of traps—in the eyes of each of these there is a single expression, borne of the conviction that his time has run out. It is a gentle expression, but infinitely terrifying to those, the living, who see it in another.

Ford's eyes held it.

Lazarus had seen it there and, at first, had been perplexed by it. To be sure, they all were in a dangerous predicament, but Ford no more than the rest—besides, the realization of danger brings a *live* expression. Why should Ford's eyes hold the signal of death?

Lazarus concluded that it could only be because Ford had reached the state of mind which makes suicide necessary—but why? He had mulled it over, seeking the cause, during the long watches in the control room, and had reconstructed the answer to his own satisfaction. Back on Earth, Ford had been a person of importance among his own kind, the short-lived. His position and responsibilities had rendered him almost immune to the feeling of defeated inferiority which the long-lived Members provoked in the people of three-score-and-ten. But in the ship he was the *only* ephemeral in a race of Methuselahs.

He had neither the experience of the elders nor the expectations of the young; he felt inferior to both, hopelessly outclassed. Correct or not, he believed himself to be a useless pensioner, an impotent object of charity.

To a person of Ford's busy use-

ful background the situation was intolerable, and held but one solution. Ford's own pride and strength of character were driving him into the dead end of suicide.

As he came into the conference room, Ford's glance sought out Zaccur Barstow. "You sent for me?"

"Yes," Barstow answered, and explained briefly the situation and the desire of the group. "You are under no compulsion," he concluded, "but we need your services if you will give them to us. Will you?"

Lazarus' heart felt light as he watched Ford's expression change to amazement. "Do you mean that?" Ford asked slowly. "You are not joking with me?"

"Most certainly we mean it."

Ford did not answer at once. When he did, his words seemed inconsequential. "May I sit down?"

A place was found for him. He settled heavily into the chair and covered his face with his hands. No one spoke. Presently he raised his head and spoke in a steady voice, "If that is your will, I will do my best to carry out your wishes."

THE SHIP had flicked by Earth's orbit less than ten minutes after Libbey had cut in his space drive. He and Lazarus had discussed the esoteric physical aspects of the ship's speed all the way to the orbit of Mars—something less than a quarter of an hour. Jupiter's path was still far distant when Barstow called the conference together which had selected Ford. It had taken nearly an hour to locate the conferees in the disorganized mob which crowded the ship. By the time they had gotten down to business, Saturn's orbit lay behind them—elapsed time from "Go!" less than an hour and a half.

But, to put it gently, distances stretch out beyond Saturn. Uranus

found them still in discussion, but Ford's name was agreed on, he had been notified and had accepted, before the ship was as distant from the Sun as Neptune.

Ford was in conference with Zaccur Barstow and Ralph Shultz, had made his tentative decisions as to organization, and had authorized Schultz to go ahead with his plans for "breaking the news" to the ship's company, when the ship reached the locus of Pluto—nearly four billion miles deep into space, less than six hours after the Sun's light had blasted them away from its side.

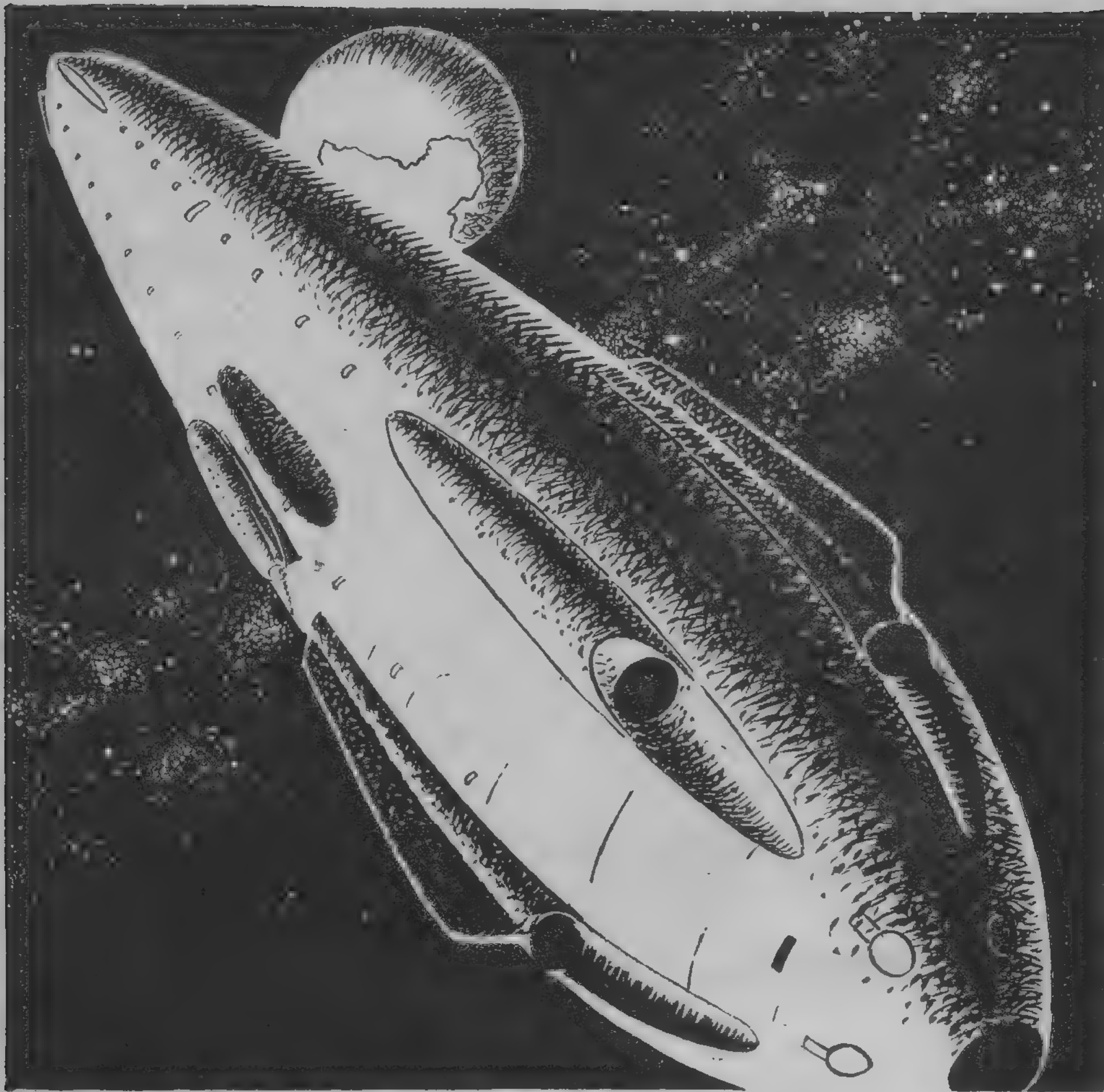
They were not yet out of the Solar System, but between them and the stars lay nothing but the winter homes of the comets and the hiding places of hypothetical trans-Plutonian planets—space in which the Sun held options, but could hardly be said to own in fee simple. But even the nearest stars were still light-years away. The *New Frontiers* was headed for them at a pace which crowded the heels of light itself—weather cold, track fast.

Lazarus refused to be captain. "Uh-uh," he told Ford and the rest. "Not me. I may just spend this trip playing checkers. Libbey's your man. Serious-minded, conscientious, former naval officer—just the type for you."

Libbey blushed as their eyes turned toward him. "Now, really," he protested, "while it's true that I have had to command ships in the course of my duties, I am a staff officer by temperament. I don't feel like a commanding officer."

"Don't see how you can get out of it," Lazarus persisted. "You invented the space drive and you are the only one who understands it."

"But that does not follow at all," objected Libbey. "I am perfectly willing to be astrogator, for that is



consonant with my talents. But I much prefer to serve under a commanding officer."

"I don't see how we are to avoid it," Ford answered him. "It may be appropriate for me to administer the internal affairs of the ship, but I can't act as captain—I am in no wise trained for it. You are."

"But I am not the only man aboard with such training," Libbey said defensively. "Several hundred of the Members, at the very least, are spacemen. A good many of them must have been officers. Your man is among them, if you will look

for him. There is plenty of time to locate him, as there is nothing for him to do just now."

They left it at that.

OUT, and still farther out—out to lonely depths where world lines are almost "straight," almost free of the flexure of gravitation—even the *Vanguard* had not preceded them here, for the *Vanguard's* course had been set for Proxima Centauri. Each day, each week, each month of their headlong flight took them farther from all humanity.

"The loci of our optimum

courses," Libbey expounded to Captain Rufus King, skipper elect of the *New Frontiers*, "is a sheaf of half parabolas having their apices tangent to our present course. That assumes acceleration applied in maneuvering will be normal to our course."

"Yes, yes, I see that," the captain cut in, "but why do you assume that acceleration will be at right angles to our course?"

"It need not be if the captain decides otherwise," answered Libbey, "but to use an acceleration with a component against our present speed would mean to attempt to backtrack to a destination not contemplated by our course in departure; while that is possible, it would waste our present velocity and require a time of flight adding up to generations, even centuries—"

"Certainly, certainly! I understand basic ballistics, mister. But why do you reject the other alternative? Why not accelerate along our course?"

Libbey looked worried. "I'm not sure. I wish I were. It would be an attempt to exceed the speed of light. That has been assumed to be impossible—"

"It seems like a good time to find out."

"But is it, captain? I am not able to visualize what conditions would obtain, but it seems likely that we would be cut off from the electromagnetic spectrum entirely in so far as bodies outside this ship are concerned. How could we see to astro-gate?" Libbey had more than theoretical considerations to worry him in the matter. The ship was now dependent on electromechanical vision. No stars were visible with the naked eye in the hemisphere abaft them; Doppler's effect had so increased the sensible wave length of all stellar

radiations as to move even the shortest right out of the visible spectrum. Forward the stars could still be seen, but he knew that what appeared to be "starlight" was in fact Hertizian waves of extreme wave length.

This had been confirmed by spectroscopic analysis. The "visible" spectrum recorded on their plates showed none of the familiar Fraunhofer lines, showed instead a pattern strange to the eyes of men.

"Hm-m-m," King replied. "I see what you mean. Well, if we did not have our passengers to consider, I'd like to try it. Damme if I wouldn't! But it's out of the question. Very well—prepare for me optimum courses to type-G stars lying within this trumpet-flower locus of yours and not too distant. Say ten light-years for your preliminary search."

"Yes, sir. Did I mention deceleration time? It works out to just under one earth year, decelerating at one g—three hundred fifty-four and five tenths days to slow down to stellar speeds."

"What? What are you talking about? We'll decelerate the same way we accelerated—with your light-pressure drive."

Libbey shook his head. "No, sir. It would seem so offhand, but the drawback of my space drive is that it makes no difference what your previous course or speed may have been, if you go inertialess in the neighborhood of a star, its light pressure kicks you away from it like a Ping-pong ball struck by a stream of water. Your previous momentum of velocity has been canceled out by the loss of mass inertia."

"Well," King conceded, "let's assume that we will do it your way. I can't argue with you; there are still some things about that gadget of yours that I don't understand."

"There are lots of things about

it," Libbey answered seriously, "that I don't understand."

THE *New Frontiers* was approximately cylindrical in shape. When not under acceleration, she spun about her longitudinal axis, giving a feeling of pseudo-weight to passengers near the outer skin of the ship. The outer shell or "lower" level of compartments had been intended, therefore, as living compartments; the inner, or "upper," levels for storage, et cetera. The main drive and the main converter were located along the axis at the highest level of no-weight.

Since the design is roughly that of the larger free-flight ships in use today, it seems unnecessary to go into more detail, as long as one bears in mind the enormous size of the ship. She had been designed to provide ample living space for a colony of twenty thousand, which would allow the original complement to double their numbers en route to Proxima Centauri. The hundred thousand and more members of the Families found themselves overcrowded five-fold.

But the space allowed per passenger had been *living* space, not the minimum *passage* space adequate for an interplanetary liner. By converting some of the recreation space to storerooms and adapting the storerooms thus cleared to the purpose of cold-sleep, the ship was roomy enough. The storerooms selected were in the high levels of low weight in order that the bodies of the somnolent would be subject to a minimum of stress. Students of biomechanics have worked out an involved empirical formula setting forth the relationship between impressed acceleration and body deterioration in conditions of artificial stupor. The answers obtained de-

pend on the drugs used, the temperature differential above freezing, age—biological—sex, race, body mass, and many other factors.

It suffices that, under the conditions selected in the *New Frontiers*, somnolents needed to be turned but once a week and required massage and check on blood-sugar count but once in three months, which greatly reduced the labor of caring for them. The care had to be taken by hand; the designers of the *New Frontiers* did not contemplate the necessity of providing facilities for tens of thousands of somnolents and had included no machinery for the purpose.

ELEANOR JOHNSON ran across her friend, Nancy Weatheral, in Refectory 9-D—called the "club" by its habitués, and less printable things by those who avoided it. Most of its frequenters were young and inclined to be noisy. Lazarus was the only thoroughgoing oldster who ate there often. He did not mind noise; in fact, he rather enjoyed it.

Eleanor swooped down on her friend and kissed the back of her neck. "Nancy! So you are awake again! My, I'm glad to see you!"

Nancy gently disentangled her friend's arms. "H'lo, babe. Don't spill my coffee."

Eleanor was slightly miffed. "Aren't you glad to see me?"

"Certainly I am. But you forget that while it's been a year to you, it's only yesterday to me. And I'm still sleepy."

"How long have you been awake?"

"A couple of hours. How's that kid of yours?"

"Oh, he's fine!" Eleanor's face brightened. "You wouldn't know him. He's almost up to my shoul-

der, and he looks more like his father every day."

Nancy hastily changed the subject. Eleanor's friends made it a point to keep Eleanor's tragically deceased first husband out of the conversation. "What have you been doing while I was snoozing? Still in the nursery?"

"Yes," said Eleanor, "or rather, no. I stay with the age group my Hubert is in. He's in pre-adolescent primary now."

"Why don't you catch a few months' sleep and skip some of that drudgery, Eleanor? You'll make an old woman out of yourself if you keep it up."

"No," Eleanor refused, "not until Hubert is old enough not to need me."

"Don't be sentimental. Half the female volunteers for somnolence are women with young children. I don't blame 'em a bit. Look at me—from my point of view, the trip so far has only lasted seven months. I could do the rest of it standing on my head."

Eleanor shook her head, her mouth set in stubborn lines. "No. That's all right for you, but I'm doing very nicely the way I am."

"She's afraid," volunteered Lazarus, "that she'll miss something." He had been sitting at the same counter, doing drastic damage to a sirloin steak surrogate and listening. "I don't blame her. So am I."

Nancy changed her tack. "Then have another child. That'll get you relieved from routine duties."

"It takes two to arrange that," pointed out Eleanor.

"But that's no hazard. Here's Lazarus, for example. He'd make a plus father."

Eleanor dimpled. Lazarus blushed under his permanent tan. "As a matter of fact," Eleanor stated

evenly, "I proposed to him and was turned down."

Nancy sputtered into her coffee and looked quickly from one face to the other. She seemed unwilling to believe her ears. "It's because," Eleanor went on, "I am one of his granddaughters, four times removed."

"But . . . but that's well within the limits of permissible consanguinity. What's the hitch? Convergence?"

Eleanor did not answer. Lazarus felt forced to reply. "I know I'm old-fashioned," he said uncomfortably, "but I soaked up some of my ideas a long time ago. Genetics or no genetics, I just wouldn't feel *right* marrying one of my own grandchildren."

"I'll say your old-fashioned!" Nancy commented scornfully. "Or," she added, "maybe you are just shy. I'm tempted to propose to you myself and find out."

Lazarus glared at her. "Go ahead and see what a surprise you get!"

Nancy looked him over coolly. "Hm-m-m," she said meditatively.

Lazarus tried to outstare her, but finally dropped his eyes. "I'll have to ask you ladies to excuse me," he said nervously. "Work to do."

Eleanor laid a gentle hand on his arm. "Don't go, Lazarus. Nancy is a cat and can't help it. Tell her about the plans for landing."

"What's that? Are we going to land? When?"

Lazarus, somewhat mollified, told her. The type-G, or Sun type, star toward which they had bent their course was now less than a light-year away—a little more than seven light-months, to be more nearly precise. It was now possible to infer by para-interferometric methods that the star—ZD9817 in the catalogues, "our" star to the Members—had

planets of some sort. To discover what sort and in particular whether it supported an Earth-type planet required a close approach at reasonably low speed.

In another month, when the ship would be a half light-year distant from the star, deceleration would commence. One year at one g would bring them to the neighborhood of the star, and with a relative speed of interplanetary magnitude. It would then be easy to search for and locate an Earth-type planet, if any were to be found, since it would shine out, like Venus from Earth, as a more-than-first-magnitude luminary. They were not interested in elusive cold planets, like Pluto and Neptune, lurking in the distant shadows, nor in hot planets, like Mercury, which hid in the flaming skirts of the mother body.

The *New Frontiers* would not land, Lazarus explained to Nancy; she was too big ever to land anywhere, her weight would wreck her. Instead, she would be thrown into a convenient orbit around the hypothetical planet; parties would be sent down in ship's boats to explore.

Lazarus left the two young women as soon as face permitted and betook himself to the metabolism research laboratory. He expected to find Mary Risling there; the brush with Nancy made him feel a need for her company. If he ever did marry again, he thought to himself, Mary Risling was more his style. Not that he seriously considered the matter; he felt subconsciously that there would be too much of a flavor of lavender and old lace about a liaison between himself and Mary.

FINDING HERSELF cooped up in the ship and not wishing to accept the little death of cold rest, Mary Risling had turned her fear of death into

constructive channels by volunteering as a helper in the longevity research which was a permanent Families' policy. She was not trained for it, but she had deft fingers and an agile mind. The patient years of the trip had made her a valuable assistant to Master Gordon Hardy, chief of the research.

Lazarus found her servicing the deathless tissue of chicken heart—"Mrs. Awkins" to the laboratory crew—which was one of their subjects for research. Mrs. Awkins was older than any member of the Families, except possibly Lazarus himself. The Families had obtained a piece of the original tissue from the Rockefeller Institute around the middle of the twentieth century—the tissue had outlived the original chicken some fifty years even then—and had kept it alive by the Carrel-Lindbergh-O'Shaug technique.

Gordon Hardy had stubbornly insisted on taking it with him to the reservation when he was arrested; a slice of it had accompanied him in the escape via the *Chili*—aseptically wrapped and kept safe and at proper temperature by holding it in his mouth.

On that occasion he had refrained from spacesickness because he had to.

Mrs. Awkins still lived and grew, fifty or sixty pounds of her. Mary Risling was reducing her size. "Hello, Lazarus," she greeted him, "stand back. I've got the tank open."

He watched her slice off excess tissue. "Mary," he mused, "what keeps that thing alive?"

"You have the question inverted," she answered, eyes and hands busy. "The question is: Why should it die? Why shouldn't it go on forever?"

"I wish to the devil it would die,"

said a voice behind them. "Then we could observe it and find out why!" It was Master Gordon Hardy.

"You'll never find out from Mrs. Awkins, chief," answered Mary without looking up. "The key to the matter is in the gonads—she hasn't any."

"Hum-m-mph! What do you know about it?"

"A little, perhaps. Anyhow," she added slyly, "I knew you before you were housebroken."

"That's no argument. That lump of muscle cackled and laid eggs before any of us were born, but it doesn't know anything. I'd trade it for just one pair of carp, one female, one male."

"Why carp?" asked Lazarus.

"Because carp never die. They get killed, or eaten, or starve, but they do not die."

"Why don't they?"

"That's what I was hoping to find out when we were rushed off on this damned excursion. It has something to do with their intestinal flora and with their ability to keep on growing."

"Amebas," said Mary Risling, *sotto voce*.

"Huh? What's that?"

"Amebas don't die. Every one of them now alive has been alive for—oh, say fifty million years—in its proper person. They divide and live on. And they *don't* have intestinal flora."

"They may have a parallel equivalent. Never mind," Gordon Hardy went on, "I'm glad you dropped in, Lazarus. I want you to do me a favor."

"Speak up."

"You're an interesting case yourself, you know. I don't want your body to go into the converter; I want to examine it."

Lazarus snorted. "'Sall right
AST—7h

with me. But you'd better tell your successor what to look for—you may not live that long. And I'll bet you anything you like that you won't find it by poking around in my cadaver!"

THE PLANET was there when they looked for it, green, lush, and young; and looking as much like Earth as another planet could. Not only was it there, but the rest of the system duplicated roughly the pattern of the Solar System—small terrestrial planets near the Sun, large Jovian planets far from the Sun. Terrestrial cosmogonists had never been able to solve the mystery of the origin of the Solar System—there are dozens of "sound" mathematico-physical reasons why such a system could never have come into existence. Yet here was another like it to show that the living paradox was not unique, might even be common.

But even more startling, more stimulating, and at the same time more disturbing, was another fact brought out by telescopic observation as they approached the planet closely. The planet held life.

Intelligent life. *Civilized* life.

Their cities were evident. Their engineering works, though strange in form and purpose, were gross enough to manifest themselves on the face of the planet. Nevertheless the dominant race, whatever they might be, appeared not to use to full extent the broad continents. It was conceivable that they could spare room for a colony.

If a colony was welcome.

"To tell the truth," admitted Captain Rufus King, "I did not expect anything resembling a high culture. Something like the aborigines of Venus, perhaps, and possibly dangerous animals. I suppose men have come to assume that they are necessarily

the only civilized race. We'll have to take this cautiously."

He made up a scouting party headed by Lazarus, whom he selected for the reason that he had come to have confidence in the man's resourcefulness and will to survive. King would have liked to have gone himself, but his own concept of the first duty of a ship's captain forbade it. But Ford could go; Lazarus chose him and Ralph Schultz as lieutenants. The rest of the party were specialists of several sorts, biochemist, ecologist, stereographer, half a dozen types of psychologists and sociologists to study the natives, other experts, including one authority on McKelvy's structural theory of symbolic communication. It would be his task to find a means of communicating with the natives.

No weapons.

King had flatly refused to arm the party. "We can afford to lose this reconnaissance party," he said, "but we cannot afford to run the chance of trouble at the outset through misunderstanding or panic. You are ambassadors, not soldiers." Lazarus returned to his stateroom, came back, and gravely delivered over to King one blaster. He did not find it necessary to mention the one that was still strapped to his leg.

As King was about to tell them to embark, the last-minute conference was interrupted by Janice Schmidt. That strong-minded female, chief nurse of the Families' congenital defectives, had pushed her way past the opposition of the captain's personal staff and demanded his attention. His displeasure at the interruption failed to discourage her.

"Captain, I must speak to you about one of my children."

"Really, nurse, you are decidedly

out of order! Get out. I'll speak with you later."

"You'll speak with me now. This is the landing party, isn't it? I've something you must hear before they leave." That got his attention; she explained briefly. Hans Weatheral, a youth of some ninety years, adolescent in appearance due to a hyper-active thymus gland, was one of her charges. He was characterized by an inferior but not moronic mentality, a chronic apathy, and a neuro-muscular degeneration which made him too weak even to feed himself—and by an acute sensitivity to telepathy.

He had informed Janice that he knew all about the planet they were about to visit and that his friends there were expecting him!

Hans was not very helpful as to conditions on the planet, "New Terra." Pressed for details as to what they might expect, he had shrugged his shoulders at their stupidity. "Oh, much like back home. Nice people. They go to school, work, go to church. Have kids and enjoy themselves. Nice people; you'll like them."

But he was quite explicit on the point that they were expecting him, therefore he must go along.

Lazarus saw Hans, Janice, and a stretcher for Hans added to his command with mixed emotions.

ON RETURNING to the *New Frontiers*, Lazarus made a long and private verbal report to King while the numerous specialist reports were being correlated into a continuity. "It's amazingly like Earth, skipper, enough like it to make you homesick. At the same time it is different enough to give you the willies. It's like looking at your own face in a mirror and having it turn out to

look like a stranger who resembled you—unsettling.

"We made a quick tour of the day side before landing, taking a look with bare eyes. Nothing to report in that which you haven't seen with the 'scopes. Then I put her down where Hans told me to, in the middle of a clearing about a mile across near the center of one of their major cities.

"Those cities have some odd features, by the way. I'll get to 'em.

"I wouldn't have picked the place myself. I'd have preferred to land somewhere free from so much attention, but you told me to play Hans' hunches."

"You were free to use your judgment," King reminded him.

"Yes, I know. Anyhow, we did it. By the time we had run atmosphere and radiation tests and checked for fungus and air-borne infection there was quite a crowd around us. You've seen the stereographs."

"Yes. Incredibly android."

"Android, hell! They're *men*. Not humans, but men just the same."

King did not dispute the point. The stereo pictures had shown him bipeds, bilaterally symmetric, possessing internal skeletal framework, distinct heads, lens-and-camera-type eyes. Their eyes were their most human and appealing features; they were large, limpid, and tragic, like those of a Saint Bernard dog.

It was well to concentrate on the eyes; their other features were not as attractive. King turned his eyes away from the loose, toothless mouths, with bifurcated upper lips. It would, he thought, take some time to learn to love these creatures. "Go ahead," he urged.

"We opened the lock and I stepped out by myself, hands bare and trying to look friendly and

peaceable. Three of 'em stepped up to me—eagerly, I would describe it. But they lost their interest at once. They seemed to be waiting for someone else to come out of the lock.

"There was only one reasonable answer. I had 'em carry Hans out. They fawned on him. They treated him like a long-lost brother. No, that's not right; it was more like a king returning home in triumph. They were polite enough with the rest of us, but it was Hans they wanted to see. Skipper, do you believe in reincarnation?"

"Well, not exactly. I'm open-minded about it. I've read the report of the Frawling Committee, of course."

"How would you account for the reception these people gave Hans?"

"I don't account for it. Go ahead with your report. Do you think it possible for us to colonize here?"

"Oh, yes," said Lazarus. "I'm sure on that point. You see, Hans really can talk to them, telepathically. According to Hans, their gods have authorized it and they have already made plans to receive us."

The report was favorable on every point, yet Lazarus felt glum about it. He could not tell King why because he did not know.

SUCH unexpected co-operation gave the operations preparatory to colonizing tremendous impetus, impetus reinforced by the sudden discovery on the part of every Member that he was sick for the feel of dirt under his feet and free air in his lungs. The *Zhachera*, or *Jockaira*—either form is permissible and neither is exact—most amazingly evacuated an entire city, of appropriate size, for the colonists' use.

The city was not too well adapted to the needs of the Earth people. Not that there was anything in-

trinsically wrong with it physically which could not readily be changed by some jury-rigged expedient; the city had adequate shelter structures, most of them underground, adequate fresh water for drinking, and no gross hazard to health or limb.

But the cultures were basically different. The Jockaira were not human beings physically and had different physical requirements. That in itself called for adaptation, though probably less adaptation than would be required to shift from a New York auto-apartment to an igloo of the ancient Eskimos. The human race is physically adaptable; that is one of its strongest points.

The city had no drainage system in any modern sense, because the Jockaira had different toilet requirements and different ways of meeting them. Rather than tear up the entire city and start over again, the Earth engineers installed self-contained 'freshers of spaceship type, using both equipment taken from the ship and materials provided by their helpful but obviously baffled hosts.

The Jockaira culture apparently did not include the idea of privacy. But again the hosts were helpful and provided thin sheets of plastic which were used for temporary partitions. (The plastic material nearly brought on 'nervous breakdowns in human chemical engineers who tried to analyze it. What can one do with a substance which declines to respond in any way whatsoever to any test within one's training or theoretical knowledge? They were reduced to describing its gross physical properties and tagging it, with magnificent understatement, as "inert.") The Jockaira were completely gregarious themselves and seemed unable to comprehend that any individual could prefer to be alone at any time

for any purpose. Apparently they came to believe—this point is in doubt—that privacy held for the Earthmen a religious significance.

Extensive preparations were made to move the hydroponic equipment, which was the basis of the food supply of the *New Frontiers*, down to the planet. Ford stopped the undertaking when it was shown that the vegetable products of the planet were usable as human food. The Jockaira were superb farmers and, once again, quite willing to share. Their agricultural methods were highly advanced and "natural"—that is to say, they had followed the line of development historically common on Earth and still common on Venus, but which had abruptly ceased on Earth after the commercial development of synthetic and semisynthetic facsimile texture foods.

Ford transferred his headquarters to the city. King remained in command of the ship. Until such a time as quarters could be readied in the city for all the tens of thousands of somnolents still in the ship, there was need for dual organization. Sleepers were awakened and ferried to ground only as fast as their services were needed and facilities were ready.

Cutting deeper than differences of bodily structure and physical habit were the intangible differences between the two cultures. The Jockaira were not human beings. They were ubiquitously friendly and helpful, and their level of scientific culture—control over environment—was at least as "high" as human culture, though differing in endless details, but their language structure, their social structure, their motives, their evaluations, their ways of looking at things, were completely nonhuman. In particular, the prob-

lem of language communication between the two races was not—could not be—completely solved.

Oliver Johnson, semantician in charge of developing a *lingua franca*, found his task made comparatively easy by the immediate channel of communication through Hans Weatheral. "Of course," he told Ford, "Hans is not exactly a genius. He just misses being a moron. That limits the words I can translate through him to ideas he can understand. More complex ideas will have to wait until we get better acquainted with the Jockaira."

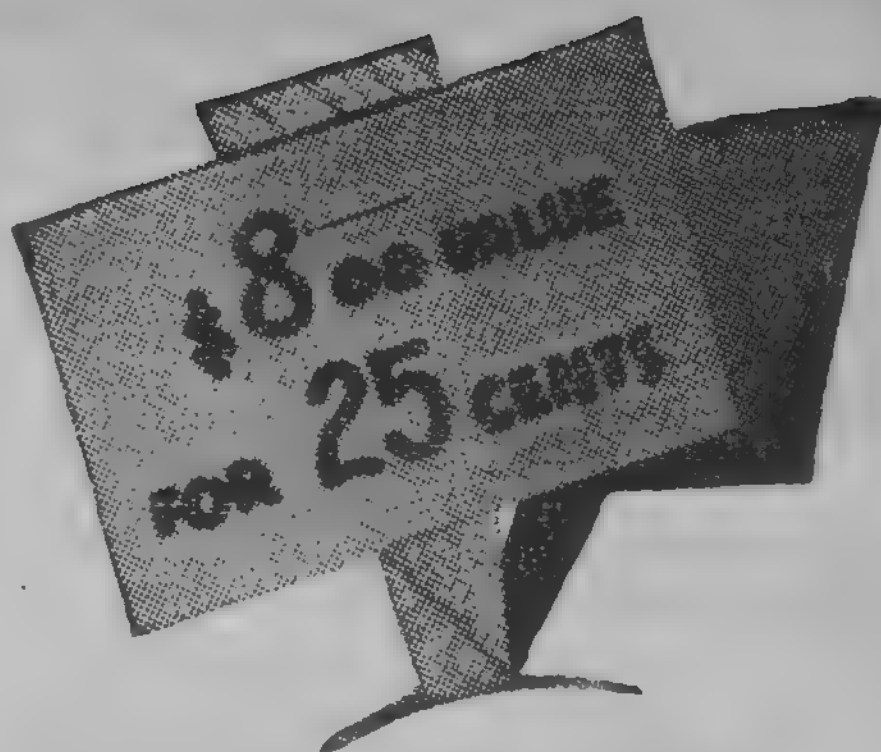
"Does that matter very much?" asked Ford. "It seems to me that I have heard it said that four hundred words are enough for any language."

"There is a degree of truth in that," admitted Johnson. "Four hundred words; or in any case less than a thousand, will do for all ordinary situations. I have tentatively selected not quite seven hundred terms, about equally divided between substantives and operationals, which will be the basis for our common language. But you must not expect subtle discriminations nor high abstractions."

"Shucks," put in Lazarus, "that ought to be enough. I don't expect to make love to them, nor discuss poetry."

THE EARTHMEN learned the common language in Jockaira words; it was too much to expect the vastly more numerous natives to learn Earth speech; furthermore, the split upper lip of a Jockaira could not manage "m," "b," "v," nor "f." The Earthmen all had the usual sound groundings in mnemonics and restricted semantics; in less than two weeks they were chattering with their friendly hosts as if they had known them all their lives.

Lazarus was forced to revise his first bad impression of the Jockaira.



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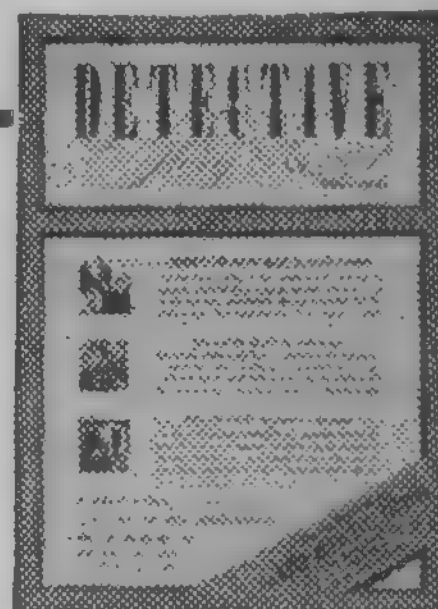
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It was impossible not to like them, once the strangeness of their appearance had worn off. They were so hospitable, so friendly, so anxious to please. He became particularly attached to Kreel Sarloo, who acted as a sort of liaison officer between the Families and the Jockaira. Sarloo held a position with his own people which could be translated as "chief," "father," "priest," or "leader" of the Kreel family or tribe. Sarloo invited Lazarus to visit him in Sarloo's home in the adjacent Jockaira city. "My people will like to see you and smell your skin," he said. "It will be a happy-making thing. The gods will be pleased."

Sarloo seemed almost unable to form a sentence without making reference to his gods. Lazarus did not mind; to another's religion he was indifferent and tolerant. "I will come, Sarloo, old bean. It will be a happy-making thing for me, too."

Sarloo took him home in the common vehicle of transportation used by the Jockaira, a wheelless wain, shaped more or less like a soup bowl, which moved quietly and rapidly over the ground, skimming the surface in apparent contact. Lazarus squatted on the floor of the vessel while Sarloo caused the car to move forward at a speed which made Lazarus' eyes water.

"Sarloo," asked Lazarus, shouting to make himself heard over the wind of their motion, "how does this thing work? What moves it?"

"The gods breathe on the"—he used an expression not in the *lingua franca*—"and cause it to need to change its place."

Lazarus started to ask for a fuller explanation, then subsided. There had been something vaguely familiar about the answer; he now placed it. It had been much the same sort of an answer he had given one of

the water people of Venus when pressed for an explanation of the Diesel engine of an early type of swamp tractor. He had not meant to be mysterious, but the paucity of common language forced him to be. Well, there was a way to get around that—

"Sarloo, I want to see pictures of what happens inside," he said, pointing. "You have pictures?"

"Pictures are," Sarloo acknowledged, "in the temple. You must not enter the temple." His great eyes looked mournful to Lazarus, giving Lazarus a strong feeling that the Jockaira grieved over his friend's lack of grace. Lazarus hastily dropped the matter.

But the thought of the Venusians brought another puzzler to mind. The water people, cut off from the outside world as they were by the omnipresent clouds of Venus, simply did not believe in astronomy. The arrival of Earthmen on Venus caused them to readjust their views of the cosmos, but there was reason to believe that their orthodox explanations did not even approximate the truth. Lazarus wondered what the Jockaira thought about visitors from space. They had not shown surprise—or had they?

"Sarloo," he asked, "do you know where I and my brothers came from?"

"I know," said Sarloo. "You came from a distant sun—so distant that many seasons would come and go while light traveled that long journey."

"Who told you that?"

"The gods tell us. Your brother Libbey spoke of it."

Lazarus was willing to lay long odds that the gods had not gotten around to mentioning it until Libbey explained it to Sarloo. But he held his peace. He still wanted to

ask Sarloo whether or not it had surprised him to have visitors arrive from the skies, but he could think of no Jockaira term for surprise or wonder. He was still trying to phrase the question when Sarloo spoke again:

"The fathers of my people flew through the skies as you did, but that was before the coming of the gods. The gods, in their wisdom, bade us stop."

And that, thought Lazarus, is one damn big lie, from pure swank. There was not the slightest evidence that the Jockaira had ever been off the surface of their planet.

AT SARLOO'S HOME that evening, Lazarus sat through a long session of what he presumed was intended as entertainment for the guest. He squatted beside Sarloo on a raised portion of the floor of the large underground common room of the tribe Kreel and listened to a couple of hours of howling that might have been intended as singing. Lazarus felt that better music would result from stepping on the tails of twenty assorted dogs, but it seemed to be expected that he would enjoy it.

Libbey, Lazarus recalled, had insisted that this mass howling which the Jockaira were wont to indulge in was, in fact, music, and that men could learn to enjoy it by studying the interval relationships. Lazarus doubted it.

But he had to admit that Libbey seemed to understand the Jockaira better than he did in some ways. Libbey had been delighted to discover that the Jockaira were excellent and subtle mathematicians. In particular, they had a grasp of numbers which paralleled his own wild talent. In consequence, their arithmetics were incredibly involved for normal humans. A number, any

number, large or small, was to them unique and capable of being grasped in itself, and not simply as a grouping of small numbers. In consequence, they used any convenient positional notation with any base, rational, irrational, or variable—or none at all.

It was luck, thought Lazarus, that Libbey was available to act as a mathematical interpreter between the Jockaira and the Members; otherwise the Earthmen would never have been able to grasp a lot of new technologies the Jockaira were teaching them. He wondered why the Jockaira showed no interest in Earth techniques strange to them which the Members offered in return.

The ululating cacophony died away, which returned Lazarus' thoughts to the scene at hand. Food was brought in; the Kreel family tackled it with the same jostling enthusiasm with which the Jockaira did everything. Dignity, thought Lazarus, is an idea which apparently never took hold here. A large flat bowl, fully two feet across and brimful of an amorphous mess, was placed in front of Kreel Sarloo. A dozen Kreels crowded around it, giving no precedence to their senior. Sarloo casually slapped a couple of youngsters out of the way and plunged a hand into the dish, bringing forth a gob of the ration, which he rapidly kneaded into a ball in the palm of his two-thumbed hand. This done, he thrust it toward Lazarus' mouth.

Lazarus was not a squeamish man, but he had to recall consciously, first, that food for Jockaira was food for men; and second, that he could not catch anything from them, anyhow, before he could bring himself to ingest the proffered morsel.

He took a large bite. Hm-m-m—

not bad, rather bland and sticky, no particular flavor. Not good, either, but it could be swallowed. With a grim determination to uphold the honor of his race, he ate on, while promising himself a proper meal in the near future. When he felt that to swallow another mouthful would be to invite disaster, he thought of a possible way out. Reaching his hand into the common plate, he obtained a large bite which he offered to Sarloo. It seemed to be a piece of inspired diplomacy. For the rest of the meal Lazarus fed Sarloo, fed him until his arm was tired, until he marveled at his host's ability to tuck it away.

Lazarus slept with the family—literally. They slept where they had eaten, without benefit of beds, and disposed as casually as leaves fallen on a path, or puppies in a pen. To his own surprise, Lazarus slept well and did not awaken until the false suns in the cavern roof glowed in mysterious sympathy of the new dawn. Sarloo was still asleep near him, and giving forth most human-like snores. Lazarus found that one of the infant Jockaira had nested spoon fashion against his stomach.

He felt a movement behind his back, a rustle at his thigh. He turned over cautiously and found that another young Jockaira—a six-year-old in equivalent human terms—had extracted his blaster from its holster and was now gazing curiously down its barrel.

With hasty caution, Lazarus extricated the deadly toy from the child's unwilling fingers, noted with relief that the safety catch was on, and reholstered it. Lazarus received a most reproachful look. "Sh," said Lazarus, "you'll wake your old man. Here—" He gathered in the infant with his left arm and cradled it against his side. The little Jockaira

snuggled up to him, laid a soft, moist mouth against his hide, and promptly went to sleep.

Lazarus looked down at him. "You're a cute little devil," he said, half aloud. "I could grow right fond of you if I could ever get used to your smell."

SOME of the incidents between the two races would have been funny had they not been charged with potential trouble; as, for example, in the case of Eleanor Johnson's son Hubert. This gangly, pre-adolescent was a confirmed "sidewalk superintendent." He was engaged one day in watching two technicians, one human, one Jockaira, adopt a Jockaira power source to the needs of Earth-type machinery. The Jockaira was apparently amused by the boy, and, in an obviously friendly spirit, picked him up. The brat commenced to scream.

His mother, never far away from him, joined battle. She lacked the strength and skill to do the utter destruction she was clearly bent on; the Jockaira was not hurt, but it created a nasty situation.

Administrator Ford made every effort to explain the incident to the amazed Jockaira. Fortunately, they seemed hurt rather than vengeful.

He then called in Eleanor Johnson and dealt shortly with her. It was the first time any of the Members had known him to lose his temper. "You have endangered the entire colony by your stupidity—"

"But I—"

"Keep quiet! I'll do the talking. If you hadn't spoiled the boy rotten, he would have behaved himself. If you weren't a maudlin fool, you would have kept your hands to yourself. The boy goes to the regular development classes henceforth, and you are to leave him alone. At the

slightest sign of animosity on your part toward any of the natives, I'll have you subjected to a few years' cold-rest. Now get out!"

He was forced to use almost as strong measures on Janice Schmidt. The interest shown by the Jockaira in Hans Weatheral extended to all the sensitives, but not to the non-sensitive defectives. They seemed to be reduced to a state of quivering adoration by the mere fact that some of the defectives could communicate with them telepathically. Kreel Sarloo informed Ford that he wanted the sensitives to be housed separately from the other defectives in the evacuated temple of the Earthmen's city, and that the Jockaira wished to wait on them personally. It was more of an order than a request.

Janice Schmidt submitted reluctantly to Ford's insistence in the matter, and Jockaira nurses took over under her jealous eye.

Every sensitive of intelligence level higher than the semimoronic Hans Weatheral promptly developed spontaneous—and extreme—psychoses while being attended by Jockaira.

Ford had another headache to straighten out. Janice Schmidt was

more powerfully, more intelligently vindictive than Eleanor Johnson. Ford was forced to bind her over to keep the peace by threatening to retire her completely from the care of her beloved "children." Kreel Sarloo, distressed and apparently shaken to his core, accepted a compromise whereby Janice and her junior nurses took over the care of the poor psychotics while the Jockaira continued to minister to the sensitives of moron level and below.

THE GRAVEST difficulty arose over—surnames!

The Jockaira each had individual names, but bore surnames as well. The number of surnames was limited, as were the surnames of the Families. A Jockaira's surname referred equally to his tribe and to the temple in which he worshiped.

Kreel Sarloo took up the matter with Ford. "High Father of the Strange Brothers," he said, "the time has come for you and your children to choose your surnames." (Bear in mind that the translation contains inherent errors.)

Ford was used to difficulties in understanding what the Jockaira were driving at when they spoke. "Sarloo, friend and brother," he answered, "I do not understand your



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words. Speak more fully."

Sarloo began over. "Our gods tell us that you, the Strange Brothers, have reached the time in your education (?) when you must select your tribe and temple. I have come to arrange with you the preparations (ceremonies?) by which each will choose his surname. I speak for the gods in this. Let me say, for myself, that it would make me happy if you, my brother Ford, were to choose the temple Kreel."

Ford stalled and tried to understand the implications. "I am happy that you wish me to have your surname. But my people have their own surnames."

Sarloo dismissed that matter with a flip of his lips. "Their present surnames are words alone. Now they must choose their real surnames, the names of the temple and the god where they will worship. Children grow up and are no longer children."

Ford decided that he needed help and advice. "Must this be done at once?"

"Not today, but in the near future. The gods are patient."

"You will hear from me."

Ford called in Zaccur Barstow, Oliver Johnson, Lazarus, and Ralph Schultz, and described the interview to them. Johnson played back the recording of the conversation and strained to catch the sense of the words. He prepared several alternative translations of the dialogue without throwing any new light on the matter. "It looks," said Lazarus, "like a case of join the church or get out."

"Yes," mused Zaccur, "that seems to come through plainly enough. Well, I think we might go through the motions. Very few of the Members have religious prejudices sufficiently deep-seated to cause them to object to paying lip service to Jock-

aira gods in the interest of the general welfare."

"I suppose not," said Ford. "I, for one, have no objection to adding Kreel to my name and taking part in whatever rites they practice if it will enable us to live in peace. I would hate to see our distinctive culture lost in theirs, however."

"Don't worry about that," Ralph Schultz reassured him. "There is absolutely no chance of any deep-seated cultural assimilation. It is a psychological impossibility. Our brains are different—just how different I am just beginning to guess."

"Yeah," said Lazarus, "just how different."

"What's that? What's troubling you?"

"Nothing. Only," he added, "I never did share the general enthusiasm for this place."

It was agreed that it would be wise to let one man take the plunge first, then come back and report what he had experienced. Schultz wanted to do it, but Ford vetoed it, insisting that it was his privilege as the responsible executive.

LAZARUS accompanied him to the doors of the temple in which Ford's induction was to take place. Ford was as bare of clothing as the Jock-aira, but Lazarus, since he was not to enter the temple, was able to keep his kilt. Most of the colonists, sun-starved after years in the ship, had adopted the local custom; Lazarus had not. Not only did his habits run counter to it, but a blaster is an extremely conspicuous object on a bare thigh.

Kreel Sarloo greeted them and escorted Ford inside. Lazarus called out after them in Earth speech, "Keep your chin up, pal!"

He waited. He struck a cigarette and smoked it. He walked up and

down. He had no means of judging how long it would be; it seemed, in consequence, longer than it was.

At long last the doors slid back and natives crowded out through them. They seemed curiously worked up about something, and none of them came near Lazarus. The press that still existed in the doorway separated, forming an aisle, and a figure came running headlong through it and out into the open.

Lazarus recognized Ford.

Ford did not stop where Lazarus waited, but plunged on blindly. He tripped himself and fell. Lazarus hurried to where he lay.

The man made no effort to get up. He lay sprawled face down, his shoulders heaving violently, his being torn by sobs.

Lazarus shook him. "Slayton," he demanded, "what's happened? What's wrong with you?" Ford turned wet and horror-stricken eyes to him, checking his sobs momentarily. He did not speak, but he seemed to recognize Lazarus. He

flung himself on him, clung to him, wept more violently than before.

Lazarus wrenched himself free of the embrace and slapped Ford hard. "Snap out of it," he commanded. "Tell me what's the matter!"

Ford shook his head at the slap and ceased his outcries, but he said nothing. His eyes were dazed. A shadow fell across Lazarus' line of sight. He spun around, covering with his blaster. Kreel Sarloo stood a few feet away and did not come closer—not because of the weapon; he was innocent of knowledge of its purpose.

"You!" said Lazarus. "For the—What did you do to him?"

Checking himself, he switched to speech that Sarloo could understand. "What has happened to my brother Ford?"

"Take him away," said Sarloo, his lips twitching. "This is a bad thing. This is a very bad thing."

"You're telling me!" said Lazarus. He did not bother to translate.

TO BE CONCLUDED.

ANALYTICAL LABORATORY

AGAIN, opinion was rather evenly divided among the stories of the June issue, resulting in high point scores. The result as of mid-June were:

Place	Story	Author	Points
1.	A Matter of Speed	Harry Bates	1.66
2.	Old Fireball	Nat Schachner	3.25
3.	Time Wants a Skeleton	Ross Rocklynnne	3.50
4.	Artnan Process	Theodore Sturgeon	3.66
5.	Devil's Powder	Malcolm Jameson	4.40

THE EDITOR.

PRELUDE TO ENGINEERING

When does an act become the use of tools as distinct from the use of a specially evolved limb or attachment? When does engineering begin—is a beaver an engineer or simply an animal following an instinctive pattern? A fact article on animal engineering.

By Willy Ley

THE life of the termites of South America must be close to complete happiness. At any event they never have to go without food. Their social system may have many disadvantages, but not to a termite that doesn't know any better. Love never troubles the average termite and there are rarely any attacks by enemies to be repulsed.

In fact those termites have only two main enemies: the anteaters and some tribes of South American Indians. The anteaters live on termites—and the Indians like them, especially the large heads of the "soldiers" that consist mainly of head anyway. When an anteater has decided that it is time for breakfast, lunch or dinner, it approaches a termite hill without fear, well protected by a fur that stops bird shot and is said to resist even small caliber bullets. Needless to say that the termites cannot penetrate. Then the anteater squats down and begins to hack a hole in the walls of the hill, using its large and immensely powerful claws as a woodsman would use his ax. Hundreds of very angry termites appear promptly and then the anteater dangles its very long and wormlike tongue among them and begins to eat a big one-course meal.

The Indians, as has been said, like

termites. They go to the nearest hill they can find, armed with a handy stone and a few long pieces of straw. The stone serves as a hammer to breach the hard wall of the termite hill. Then a straw is inserted, the soldier termites attack it as "enemy," bite into it with power and thoroughness and soon find themselves in the mouth of the Indian who drags the straw through his teeth.

Anthropologists and scientists from neighboring fields of knowledge do not quite agree whether the Indian's practice is a direct imitation of the anteater's way of feeding or whether the Indians invented their hunting method independently. But every scientist agrees emphatically that this is an *exemplum magnum* of the real difference between Man and animal. The animal, to accomplish a certain feat, has to have or to evolve a special organ for this accomplishment; while the man invents a tool. It is ridiculously easy to prove the enormous advantage of the human method. To cut or slash an animal has to grow claws or saber teeth; the man takes a knife. After the hunt or the war is over the man puts the knife away and his hand is still as good as it was before, good for sewing or painting or writing and all other kinds of fine work. But the

animal's body is cluttered up with claws or teeth or other organs and not much good for anything else.

This is, of course, also the reason why highly specialized animals do not survive a change of environment. The advantage of their specialization was great, but of temporary value only. The more primitive ancestors and cousins never had that great advantage, but when changes come they continue to muddle through successfully.

It is not just a curious accident that Man, anatomically speaking, is as primitive as possible. About all that anatomists are able to detect in a careful examination is a slight specialization of the frontal teeth—said to be adapted to scooping out juicy fruit pulp; a somewhat more distinct—but very obscure—specialization of the feet; and a very pronounced—and not at all obscure—specialization of the brain. It is the latter, of course, which conceived the tools, thus permitting the body to remain primitive and unarmed—for weapons are only a special kind of tool.

Blaise Pascal came very close to the truth when he said that "Man is but a reed, the weakest in Nature, but he is a thinking reed." The wrong part in this sentence is the statement about weakness—because adaptability is anything but weakness. And that adaptability also provides for something that could not be accomplished in any other way: it furnishes additional "body space." An animal has normally four limbs, one head and one tail to carry tools around with; the man can build a tool shed or an armory. And as regards preparedness the animal usually has to choose between weapons or armor, while Man has to worry about the production for both.



Fig. 1. The tree frog's pollywogs swim in water—high in the air. Is the nest engineering, though?

YES, but how about those termite hills? They are more than just organs—they are fortresses of formidable size and strength. They are so strong that no animal of approximately the same size as a termite could ever hope to breach the walls. Man himself has to use a high explosive to remove these twenty-foot fortresses if they get in his way. In that respect at least, animals do what Man does, they provide a "community armor" in lieu—or in addition to—individual armor.

It is amusing that at the time when some authors wrote articles and books about the tool-vs.-organ thesis and all but denied "tools" to animals, skillfully overlooking birds'

nests as well as spider webs, other authors could not find terms sufficiently strong in admiration of the termite towers. Trying to impress their readers with the size of these structures they usually divided the height of an average tall termite tower by the length of the insect and then multiplied that figure by six to show how high—expressed in feet—human structures would have to be to compete. Of course, there were no “comparable” structures; they had to use mountains. British authors engaged in such computations showed a remarkable partiality for the Matterhorn, a 14,700-foot peak in the Alps. Now how did the Eiffel Tower or the Woolworth Building in America—Chrysler and Empire State were still to be erected, then—compare with the Matterhorn?

The example is wrong, of course. What these authors overlooked was the very simple fact that the relations between tensile strength, surface and weight change with size. A structure of the size of the Matterhorn, to be erected of stone, would probably have to be almost solid, and such a “mound” could be piled up if humanity really wanted to. As far as plain size is concerned the Maginot Line and the Westwall surpass anything termites ever built, even if the wrong method of computation be maintained for comparison.

As indicated by the termite hills the rule that an animal has to grow an organ when Man invents a tool is not exactly watertight. It covers the ground of existing facts very much as a net does—the ground is “legally” covered all right, but everywhere there are holes with thinking reeds peeping through

Monkeys use pebbles to crack nuts

and to throw them at people they do not approve of with or without reason. African apes catch ants with saliva-moistened blades of grass. Frogs living on dry land build little ponds for their eggs to hatch in and the so-called trapdoor spiders carefully camouflage the entrance to the simple tubular burrow.

These few random examples show that the field is wide and that it might be a good idea to attempt a classification. There are evidently three main types of animal engineering.

THE LOWEST and simplest stage is that represented by the webs of spiders and the honeycombs of bees. It is the external use of a material produced by the body itself. Such external structures are still very close to organs and the dividing line between organ and structure is provided by the fact that an animal can leave its structure—at least temporarily—and survive, but that it cannot leave an organ.

A snail shell is, therefore, very definitely an organ; it cannot be removed without injury to the snail. The thought that a snail might be able to leave its shell and later go back into it sounds very much like a scene from one of Walt Disney's “Silly Symphonies.” The very thought makes you visualize the snail in the act of sneaking up on somebody and hitting him over the head with a big stick. Till the victim recovers, the snail is back in its shell and looking very sleepy, most innocent and not at all interested in outside events. But the Paper Nautilus—a king of octopus with the beautiful name *Argonauta argo*—can almost do that. It does not hit anybody over the head with a stick, but its shell is not attached to the

body and it is believed that it is used mainly as a cradle for the young.

The very fact that such a thing is possible at all proves that in this category animal engineering is still very close to organ growing. Another example of an organ changing into a tool—"tool," in this discussion, means everything used by an animal without being grown to its body—is provided by little *Oikopleura*. *Oikopleura*, living in the high seas—and belonging to the *Tunicata* that once almost became vertebrates but did not stay that way—produces a substance chemically akin to cellulose. This substance does not form a close-fitting shell or armor, but something like a barrel around the body. *Oikopleura* moves by the reaction of a tiny jet of water and its microscopic food is inhaled with the water which is to be jetted out in the rear. After some time indigestible particles accumulate to such extent that *Oikopleura* cannot use its vessel any more. Or an enemy attacks. In either case *Oikopleura* just slips out of its boat and quietly exudes a new one.

The next higher step in animal engineering is evidently the use of external material for external structures. And the third and highest step is the use of tools as we understand the term in normal life.

But before progressing to the next higher step I would like to tell briefly about two famous examples belonging to the first and lowest order.

They are the "hanging puddles" of the flying frog from Java and the nests of the bird that goes under the name of "edible swift." In the case of the flying frog male and female kick the gooey stuff surrounding the freshly laid eggs with their hind legs until it changes into something like

whipped cream which then hardens on the outside and turns to water inside, as nursery puddles for the tadpoles to hatch and grow in. The "edible swift" builds its nest exclusively of its own saliva which hardens as soon as it comes into contact with the air. These nests look like small shallow saucers of white porcelain and as long as the bird has not used them for hatching its young they are edible—or rather there are people who eat them.

The next step is the use of external materials for the building of nests and fortresses. That step ranges all the way from the nest in the nearest hedge and the molehills in your front yard to those termite towers that were compared to the Matterhorn.

The word "nest" suggests a bird's nest to most people and all those who live in cities are more or less of the opinion that bird nests do not differ very much from each other, except for size. As for the building material it is often believed that it is a question of convenience, meaning that the bird will use what is most handy. None of these assumptions is true. In the first place there are very many animals other than birds that build nests. Particularly, some small rodents build nests that are hard to tell from genuine bird nests. Furthermore, most bird nests are so distinct that they can be recognized at a glance by an expert. The role played by convenience or rather availability in the choice of the building material is surprisingly little. Birds manage to find what they want in fairly incredible places and situations and most of them are not at all quick to use substitutes. As to types, the basket nest is the most common. The term basket nest not only describes the shape of

the finished product but also the type of work involved making it.

Then there are the mud nests where the bird seems to have profited from watching a mason at work. These nests are often of a near-spherical shape with only a small opening. And intruders that are too lazy to build for themselves better keep away from conquests of such nests. The original owner is often not a very stubborn defender of his property but may have the nasty habit of plugging the small opening while the conqueror is out on business or even while he is asleep.

The prize for beauty as well as for strength goes doubtlessly to the nest of *Remezia*, the penduline titmouse. Children in southeastern Poland use these nests as warm shoes; all they need to do is to widen the opening a bit so that they can get the foot in.



Fig. 2. The archer fish yields to no one so far as accuracy of aim goes.

IT IS IMPORTANT that no real tool has appeared so far in all these manifold activities. Rows of termite hills may dominate a landscape, dams built by beavers may change the character of whole forests and the "apartment-house nests" of certain African birds may spread through the boughs of a copse of trees—but it is all done with organs. The building material is "extraorganic," to use the correct term which denotes that it was not grown by the body of the animal which makes use of it, but is shaped and put together with teeth and claws and bills, not with tools.

The use of tools is of lesser magnitude and not always conspicuous, which may be the reason why it was not noticed so quickly. But the examples, once recognized as such, are numerous and show all possible degrees of ingenuity. That monkeys crack nuts by means of hammering at them with pebbles has already been mentioned. Since only the smaller varieties do that and since even they often enough use their teeth as a nutcracker I suspect that the invention of the hammer was caused by oversized nuts which were too large to be put into the mouth.

Another and rather surprising use of a small pebble is made by an insect. The digger wasp, after having deposited its eggs in the ground, takes a tiny pebble, and, holding it in its mandibles, pounds the ground smooth with it, so that other insects may not find the eggs.

Strangely enough the use of tools was never developed to any appreciable extent by mammals. In fact, the few isolated instances in which monkeys and apes employed stones, tree branches or grass blades are the only examples that have come to my attention. Examples of birds and

other creatures lower in the evolutionary scale are much more numerous and varied.

You have doubtlessly heard of *Pagurus striatus*, the hermit crab, with its soft unarmored tail which is safely hidden away in the empty shell of a large sea snail. To add some real armament the crab collects sea anemones that can sting—usually of the variety of *Sagartia parasitica*—and puts them on top of the shell. It has been observed that these sea anemones actually wait for hermit crabs. They gain considerably by that association: firstly, because it provides them with more opportunities for catching prey. Secondly, because the crab feeds them directly. When the crab has grown too much to be comfortable in the old shell, it goes around in quest of a bigger one and when it is found crab and sea anemones move. Another crab which does not need borrowed armor, because it has got complete natural armor of its own, walks around brandishing small living sea anemones in its claws. And a third one uses seaweed or small sponges and the like for camouflage.

Still, that snail shell, while a tool for the crab, is something that can be found—or obtained in eating the snail—ready made. We like to see something that has been built.

The wish can easily be granted. All that is necessary is to go out and look in fresh-water lakes or streams for a little creature that goes under the name of caddis worm. If that quest fails, a book on entomology will provide it indexed as *Macronema rebratum*.

The caddis “worm” is the larvae of a small flying insect which belongs to the order *Trichoptera* and that, if paleontologists guess right, represents the ancestors of the butter-

flies. The adult insect or imago does nothing especially noteworthy, save for propagating the species. But the larvae—well, that’s a better story. They live in fresh water, as has been indicated, and strongly feel the need for additional protection. They spin a round case first, shaped like a slender barrel with a bottom. Head and some of the legs protrude from the open end. After that is accomplished the larva really starts working. The silky “barrel” is covered on the outside with extra-organic material, with shells of young fresh-water snails, or with tiny pebbles, or with pieces of thin dead stalks of underwater plants, all neatly cut to the same length and put together to a hexagonal tube. It seems that the larva uses what happens to be around, but once a strengthening material is chosen the larva sticks to its choice. There are no “mixed” caddis-worm cases; it’s either sand grains, or snail shells, or miniature lumber.

ANOTHER insect of the same order, but of a different family—*Hydropsychidae*—produces woven cairns of peanut-sized pebbles, to withstand the current of the brook. Again it is the larva that does the work, the adults are less interesting. The larva of a third insect—*Myrmeleon formicalex*, the ant lion, this time of the order *Neuroptera*—is the inventor of artillery. The victims of the ant lion, the ants as can be guessed from the name, have nothing to fear from the adult which looks like a small dragon fly. But the larva digs a cone-shaped pit in dry sand and hides itself in the sand underneath, so that only a small part of the head shows at the center of the inverted cone. When an ant approaches the rim of the pit the ant lion’s head throws grains of sand at the victim.

The accuracy of the bombardment is uncanny, the ant loses its balance and tumbles down into the pit—and into the waiting mandibles of the ant lion.

The method is reminiscent of the "shooting" of the Siamese archer fish *Toxotes jaculator*, which throws drops of water at flies and other insects resting at the water's edge or on plants above the surface. The shooting mechanism is a kind of blow tube, formed by a groove between two ridges in the roof of the mouth and by the tongue. The marksmanship is amazing. *Toxotes* can shoot insects on the wing and hit a target more than a yard away. One observer saw it shoot a small lizard—but that was impractical as the fish could not devour prey of such size. Another observer had his cigarette extinguished by such watery bullets, the fish apparently thought that it was a glowworm.

Both the ant lion and the archer fish depend on gravity to deliver the prey. Birds have discovered a method to let gravity do a little more. Sprague de Camp mentioned in one of his articles—*Astounding*, November, 1939—that "seagulls fly up with clams and drop them on rocks, thereby breaking them open," and that along the New Jersey coast cars have been damaged that way. The Greek eagle has invented exactly the same method for coping with the hard carapaces of the Greek land tortoises and is blamed for the incidental murder of a Greek peasant whose skull proved to be not quite as hard as the shell of the tortoise.

The European song thrush is even known to use special "anvils," rounded stones in the woods against which the thrush beats wood snails until their shells break.

In a book on Australian birds by

an Australian zoologist—A. H. Chisholm—I find a report of veritable dive bombing. A large black-breasted buzzard of the inland areas had discovered a fondness for emu eggs. Now the emu is large and cannot fly; its nest is, therefore, on the ground. The buzzard frightened the emu away by flapping its wings at the brooding bird, then seized a stone and dropped it into the nest in a low-altitude attack, breaking the eggs.

The birds of Australia seem to be an inventive lot all the way through. Of some small bug hunters it is told that they use dry blades of grass to reach into cavities under loose bark where their bill is not long enough. A parrotlike bird from nearby New Guinea is known to wrap the hard and very smooth palm "nuts" which are its sole food in coarse leaves so that they cannot slip away when carried around. And at least one of the bowerbirds even invented painting.

The bowerbirds got their name from the bowers they build for strictly amorous purposes. Such a bower consists of two parallel walls of twigs put upright into the ground. In front of the entrance the bird amasses a large collection of things he finds interesting and with which he hopes to impress his lady friend. Glittering objects are not as much in demand as may be thought; the birds go for certain colors, blue in the case of the Satin Bowerbird. Here's the list of objects found in front of one bower:

Eight bags of wash blue, 10 pieces of blue match boxes, 1 blue empty cigarette pack, 1 blue envelope, 1 piece of blue string, 34 pieces of blue glass, 17 blue feathers, 1 blue marble, 1 parking ticket (blue print on white cardboard), 4 blue choco-

late wrappers, a blue invitation card to an "At Home," 8 yellowish wood shavings, 2 pieces of yellow onion peel, 8 snail shells, 1 cocoon, 6 cicada-cases, large numbers of blue and yellowish-green flowers.

It is impossible to cultivate blue flowers where Satin Bowerbirds are around. The painter among the bowerbirds is just this fellow who shows such a marked partiality for blue objects. To quote from Chisholm's report:

Many times I had seen bowers containing blackened sticks and had imagined these to be charred in fires. That hasty conclusion was dispelled a few years ago. It was established then that the bird actually brings charcoal to the bower, munches it into a paste and, holding his head sidewise, paints each stick of the inside walls with his beak. Moreover, he carries fragments of soft bark to the bower and holds one of these in the beak while applying the mixture. We surmised at first that these scraps of bark were used as brushes; but it now seems more probable that they are by way of being stoppers, or corks, to prevent the mixture oozing from the tip of the beak while it is being applied to the walls with the sides of the beak.

That sounds as if it were impossible to beat, but other Australian birds have made an even greater invention, less artistic, to be sure, but representing technological progress in the strictest sense of the word. They are the mound builders. There are three kinds of them: the Scrub Turkey or Talegallus, the Megapode and the Mallee Fowl. None of these birds will ever brood, but they take care of their eggs just the same. They pile up immense mounds—one Megapode mound measured sixty feet in circumference and was fifteen feet high, it had been believed to be a burial mound of the aborigines—of decaying leaves and place their eggs inside, to be hatched by the heat produced by the molding



Fig. 3. The bird that built it thought it was a nest—but humans find it makes a swell shoe if you need one!

vegetation. The eggs are placed in an upright position three to six feet beneath the top of the mound, the young birds emerge without assistance from their parents. Rarely a small mound made by only one bird is found. Normally it is a community oven shared by between three and twenty couples.

THE ACTIVITIES of the Talegallus birds bring us back to community life and it is at this point where ants enter the picture. That ants would

figure in this symposium sooner or later was to be expected, of course. They are known to perform complicated tasks.

There are the harvesting ants which live mainly in the moderate zone where pronounced seasons direct the rhythm of life. They store grain in subterranean chambers, somehow preventing the seeds from germinating. Then there are all the ants which keep "milk cows," domesticated aphids, both above and below ground. There are, furthermore, those rather complicated city-states with beetles for guests and other ants for slaves. Just to make the whole thing more amusing such communities may be infested with small "robber ants" which live in cracks too tiny for the regular ants to squeeze in and which live in about the same relationship with them as mice do with men. The beetle "guests," incidentally, exude a habit-forming poisonous drug which would ruin the community if the grubs of those beetles could grow up and multiply their numbers. They fail to grow up only because the ants treat them with the same care as their own grubs—and those of the beetles are killed by so much care.

Then there are the far-famed "parasol ants" of South America which cut pieces from leaves and carry them in long processions down to their subterranean gardens, as food for a fungus growth which, in turn, supplies food for the ants.

But while slaves and "guests" and fungi might be regarded as "tools" in the broad sense of the word, I really wanted to tell the story of *Oecophylla smaragdina* of Ceylon.

It is a variety of ants living high up in the trees, in small nests spun together of living leaves. They are ignorant of the refinements of ant

civilizations elsewhere on earth. They have no granaries and no fungus gardens and probably neither guests nor slaves, only a few "milk cows" around on the leaves of which their nest consists. The strange thing is, however, that these ants *cannot* spin. But just the same all their nests were always found to be held together with neatly placed and properly spaced threads. It took a long time until the puzzle was solved—and it was a simple but most surprising solution.

The full-grown ants cannot spin, it is true, but their grubs can. Therefore, the ants "simply" use their own grubs as tools. One squad is holding two leaves together with the mandibles. Another squad waits on the other side of the leaves, holding grubs in readiness. And as soon as the leaves are in position they squeeze the grubs which thereupon release a sticky thread. Swinging the grubs back and forth and touching them alternately to both leaves the second squad produces a neat suture and when the threads are dry the first squad lets go. Very, very simple, indeed.

ANOTHER intriguing story from the tropical zone concerns a creature which haunts the beaches and climbs the palm trees of a large number of South Sea islands. This time it is a crab, the *Birgus latro* of zoologists or "robber crab" of travelers disinclined to use big words for small animals. *Birgus* is small, however, only if compared to the biologist who snoops around to investigate the robber crab's habits. It is a rather large fellow as crabs go, shaped like a lobster but generally heavier and built along more rugged lines.

The diet of these crabs is monotonous, though not unpleasant; it

consists solely of coconuts. The crabs form regular harvesting parties, preferably when a full moon hangs in the tropical sky. Some of the crabs then climb up on the trunk and go to work on ripe nuts, using their natural shears and pliers. The others wait on the beach and disassemble the nuts as they drop down. After having removed the thick outer layer of fiber they break through the "eyes" of the nut, those thin-walled circular spots near the upper end. Having breached the shell they reach inside with their smaller legs, shredding the nut meat and pulling it out for a feast.

But those fibers are not thrown away. *Birgus* sleeps during the day, between the roots of palm trees or in small natural caves. And cocoa fibers are just the right material for a soft and comfortable bed. The climax of the story is that some observers saw them move the shells of coconuts. And occasionally abandoned shells were found, filled with sea water. No doubt the crabs have a use for that, too, but why and how they do it still remains to be discovered.

ALL these facts, taken together, not only prove that the old organ-vs.-tool theory is somewhat leaky, but they also provide a partly scientific and partly philosophical headache of much interest; namely, the question of just where primitive Man can be fitted into the picture.

When our own ancestors were still cave dwellers the birds and many other nest builders, including the multitudes of burrowing rodents, had progressed much further in the fine art of homemaking than the Crown of Creation. But they were and

still are birds and rodents while the cave dweller became, or already was, a *man*. There is no doubt about the facts, if course; the question is where "man" begins to show where to put the dividing line of ingenuity.

The temptation is great to say that the exact border line is marked by the "improved tool." The monkey who finds a nut too large or too hard to be cracked with the teeth takes *any* stone that is handy, while primitive man is supposed to have used and preserved a particular stone with an especially convenient shape. And a little later on he *made* a stone of convenient shape, improving the tool with another tool. Well, yes, but he must have started with taking any stone that could be handled. Should we deny the term Man before the stage of improved tools was reached? And please remember that a song thrush has a favorite "anvil," that the Satin Bowerbird paints and that woodpeckers sometimes first make a hole into which to put an acorn or a pine cone to be worked. These are "improved tools" of a sort.

Please do not expect me to tell you the exact line of demarcation. The knowledge of fire cannot be used for this purpose because that would exclude thousands of generations of creatures that were doubtlessly men. Significantly enough, we were not able to draw sharp lines even between the various stages of animal engineering which could be expected because the whole is an evolutionary process and the various definite stages in evolutionary goings-on are never separated by sharp border lines, but only by border territories in which many strange things can and do happen.

BIDDIVER

By Theodore Sturgeon

Biddiver was a little man who got rich, got drunk, got into the wrong "automobile" and—because it wasn't an automobile, but something else—got changed!

Illustrated by Kramer

It is even truer in fact than in fiction that more important business is transacted in palaces of pleasure than is ever handled in austere offices. Such a deal was taking place in such a hangout between two swarthy individuals who sat in a semiprivate room just off the dance floor of the Purple Pileus, the most expensive drinkery in the most exclusive section of the richest city on three planets.

"I thought you might like it," said one of the two men. "Inside and out, it's a standard model—two wheels, gyro-stabilized, antigrav plates to support it while the wheels drive it; conventional controls. Old George Carrington himself couldn't tell it from the latest Carrington '78."

"What's that to me?" said the other. "I'm satisfied with the cars I have."

"You won't be, Eric, when you've seen this one. It's just a little bit special."

"With a special price on it, hey?"

"Nothing you couldn't afford. You can have it for a present if you'll play ball with me. I mean"—he added at the other's quick glance—"if you'll allow me to play ball with you."

"What's your proposition?"

"Something like this—I am cut to the quick when my own brother

is victimized by such a creature as The Fang. A terrible thing. The finest ship in your fleet, wasn't she? And pirated, burned to a cinder, crew and all, by that spectacular criminal with the melodramatic name. *Tsk, tsk!*"

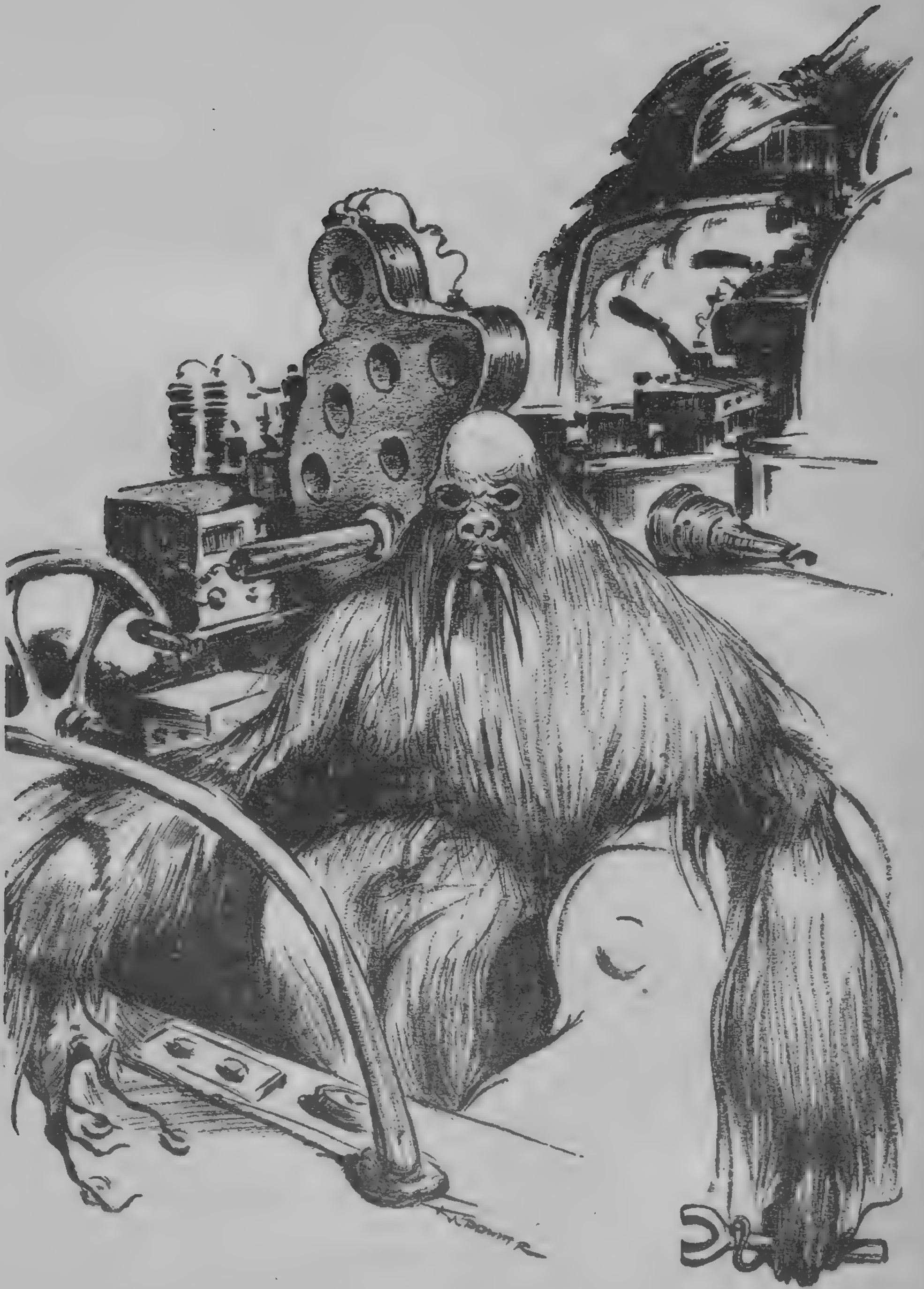
"Get to the point," growled Eric. "Even if I had nothing to do with my time, you'd still be wasting it."

"I'll get there," said his brother happily. "That piracy—it was particularly tough on the insurance company, wasn't it? The cargo was insured for ten times the value of the ship, which in itself was plenty."

"It cost me ten times the value of the ship," said Eric shortly.

"Of course it did. I read the record of the investigation. A government man stood by a sealed meter and watched the stuff being pumped into the tanks. Only thing is, one of my men was watching the flow in your secret chamber under the loading platform. Every drop that went into the ship wound up in the tank it came from. Two million barrels of lucasium, the finest atomic fuel yet synthesized. The insurance company paid you for it; then you sold it to Martian Spaceways, whose stock you control, at a phony high price 'justified' by the shortage created by The Fang's highjacking."

Eric's knuckles whitened against the background of the blue cham-



He didn't know just who or what had designed the car, but he knew that he was superior. He'd improved on it—

pagne in his glass; otherwise he gave no sign of having heard.

"Before I go on," continued his brother easily, "I want to point out that my death will result in the delivery of two cans of sound film to the government. They tell the whole story. I'll run off a print of them for you any time you'd like to see them. In other words, it'll pay you to see that nothing happens to me."

"The air in here," said Eric absently, "smells of blackmail."

"Perish the thought!" said the other primly. "Have I demanded anything?"

"Not yet," said Eric. "And to tell you the truth, that's what bothers me a little. I know the way you work—I should, by this time—and I don't doubt that you have the film you mentioned. You're the only man I ever heard of who was oily enough to get it. What else can you want but a payoff?"

"I want to help you. I want to fight this menace shoulder to shoulder with you. After all, blood is thicker than water. Never let it be said that Budd Arnik wouldn't risk half the danger that threatens his brother."

"I get it. For half the 'danger,' half the profits. Right? You got a busy liver, son, building up all that gall. The answer is *no*!"

Budd stretched out his legs, shoved his hands deep in his pockets and smiled at his brother. "When I said I could help you, I meant it. You've set yourself up a nice racket there, but you always did lack imagination. You haven't begun to tap the possibilities. Now, about that car I was trying to give you, because I like you so much. It's—well, look!" He pointed at the glassbrick wall, through which could be seen the exquisitely landscaped driveway

which led up to the Purple Pileus.

A beautifully clean vehicle swept in at the gate, just one long, lean sliver of chrome and iridescent blue. There was bulk there, and weight, but it took an engineer to spot it, so fine were its ultra-streamlined curves. Its two wheels, which thrust themselves far ahead and behind the car, were individually sprung, and supported the great teardrop about six feet off the ground. Both wheels ran inside a tread which moved on shaped tracks, so that they were rounded in front and sharply pointed in the rear. From the ground up, then, each fore-and-aft cross section of the machine was a perfect streamline. The car came to a whispering stop at the entrance, and the wheels retracted, setting the hull swiftly and gently to the ground. A lovely sight.

"Carrington '78," said Eric. "What about it?"

"Just the thing for the man about town, isn't it? To look at, it is simply the right vehicle for a man of your position. The one I have parked outside is exactly the same in every respect—with a slight difference. It has every feature of a stock car, with just one or two more."

"Such as—"

"A momentum neutralizer. An automatic refueling screen—repels large bodies, sweeps in small ones for transmutation into air, food, fuel. And—an armament. Why, I couldn't begin to tell you—"

"You don't have to," snapped Eric. "What the hell use is a car like that to me? Or—to my organization?" He sipped slowly, digesting the items Budd had just reeled off. "What's the idea of all that gadgetry on a surface car?"

"The idea is that it isn't a surface car, obviously. Why, that ma-

chine will operate practically forever without having to stop for fuel and supplies. It will fly. It will push the speed of light between here and anything you can see with a telescope. Don't you see, or is it that you won't admit it? It's the perfect getaway. The perfect front. Piracy? Pal, you haven't touched the subject. For example; suppose you ship a cargo of automobiles to Mars, and there is another regrettable incident like The Fang's little coup. The ship just might explode gently enough to strew that portion of space with parts of the cargo. Thereafter, any other ship on the same run, sighting an automobile afloat in space, would pay little attention—until the automobile began spouting atomic shells and setting up a sleep-destroying field.

"Outlets for the stuff? Well, there's the colony on Neptune—remember? It was a prison once, and they revolted just for the privilege of staying where they were to colonize like free men. I don't have to tell you about Mars and Venus and the asteroid colonies. We'd do all right."

"On principle," said Eric. "I hate to confess it, but you really have something there." He beamed. "Yes, you most certainly—" The two swarthy heads moved closer together over the table.

NEITHER of the Arnik brothers was in a position to see the man who stepped out of the blue Carrington and strode purposefully into the Purple Pileus. Protecting his jauntiness with a hundred-dollar bill, he evaded the grim headwaiter's obvious intention of locking him out, and marched up to the bar.

He was a most extraordinary figure, from the top of his mauve streamlined hat, through his irides-

cent vest to his flexi-glastic shoes. He barely cleared five feet. His body was tubby but his arms apparently couldn't understand that, for they were long and scrawny. From his brow to an inch below his eyes, his nose turned up; from there on, down. His short upper lip slanted sharply toward his tonsils, which had the effect of making his chinlessness positively jut. He ordered *lyanka*, which is the Martian word for "equalizer," with the air of a man who couldn't possibly hold even one but who has just had three. The large bill on the bar overcame the barkeep's desire to protect a customer against himself, and the man was served. He slurped from the goblet and looked around him.

"So this is the top. This is the—wha' you call—ul-timate."

"This is the Poiple Pileus," said the bartender.

"Oh, yeah . . . yeah . . . I know. What I mean, this's what people work up to. People put down numbers in books, maybe, drive transports—stuff like that, five hours a day, five days a week, week in, week out." He ran out of breath and inhaled some *lyanka* with his air. "People . . . *fft* . . . 'scuse me . . . all got the idea some day they'll be rich. When they get rich, they come to a place like this. *Fft*. What I want to know is, why? Get just as drunk at Casey's Hardwater Store."

"Casey's ain't exclusive," the barkeep pointed out.

"Take me, now," said the fantasy on the paying side of the board. "Biddiver's my name. Two days ago I'm on the assembly line-up at General, and somebody name of Phoebe Biddiver dies. Yesterday I got two million bucks, free and clear. Today I buy everything I ever thought I wanted and go every place

I ever wanted to see. An' now what?"

"What?"

"An' now I don't know what to do tomorrow." The bartender was fascinated by the way the teardrops proceeded down Biddiver's amazing nose. One drop would dash almost halfway, and then hesitate, daunted by the hump. Then it would be joined by another teardrop, and the two, merging, would surmount the obstacle and slip down to hang glittering over the disappearing lip until a sob came along to shake them off. "I ain't done nothin' to nobody," complained Biddiver brokenly. "I don't want to do nothin' to nobody. What did I do to deserve this?"

"Guys what don't want to do nothin' to nobody," said the bartender, in a philosophic flash, "most generally don't amount to nothin'."

"What d'you mean?"

"Just what I say. This place, now, it crawls with big shots. Every one of them walked up to the top on other guy's faces. Take that Fang feller now, that's in all the papers. Bad egg, sure. But at the top all the same. Sneaks up on a tanker on the Earth-Venus run, swipes the cargo, burns the ship and the crew, and disappears. Then he tells three planets an' the whole Belt, speakin' through every ultraradio set that happens to be turned on, that he is The Fang, an' he is the one who done it, an' he'll do it again whenever he feels like it. Not a direction indicator in the System can locate where he's broadcasting from. See what I mean? He's smart an' he doesn't give a damn about who he roughs up. Now look. See those two guys in that semiprivate over there? They're the Arnik brothers. One's a shipper an' the other's a kind of

free-lance gorilla. They operate the same way as The Fang. They must like it or they wouldn't keep it up." He nodded sagely. "If I had as much change as you do, I wouldn't get down in the mouth about it. The main idea in gettin' really rich is to be rich in the first place; then you make your money, take people out, lose 'em and come back with their bank accounts. I seen it done right here."

Biddiver shook his head weakly. "I don't think I could be that kind of a heel."

"You can be. Rich people can't afford to be nice about things. Only guys who work for a living can do that, an' even then they got to watch themselves or they'll get took over." He peered at Biddiver, judging expertly his state of insobriety, and then pointedly took away his goblet, rinsed it and put it away.

Biddiver took the hint because, by now, he wasn't feeling so good. He waved the change from his bill back to the bartender and weaved out. The barkeep pocketed the money, shaking his head sourly, quite unaware of the fact that his little speech had created an interplanetary menace.

Biddiver somehow reached the Carrington and nudged the door open. He sprawled into the driver's seat and touched the starting lever. The door locked as the machine rose up on its two wheels, gyroscopes whirring ever so faintly. On each side of Biddiver, an upholstered arm swung upward until it embraced him in foamy comfort. He pressed the panel which presented itself to his right forefinger; the brakes released themselves and the machine started forward. Pulling gently with his right and then his left hand, he turned the car and wheeled it out of the gate and into the street. Plas-

tered as he was, he realized that in this machine he had one thing that it would take him a long, long while to tire of. He pressed the accelerator under his finger, and as he passed the 150-k.p.h. mark the speedometer's mechanical whisper cut in—"One sixty— One sixty-eight— One eighty—" He loved the sleepy surge of the car, its metrical obedience. "Damn if she won't up an' take off one of these days," he muttered as he leaned over to turn on the radio.

And when he flipped the switch she did take off.

"WHAT I don't understand," said Eric Arnik, "is why you bother to come to me at all. You have the goods on me, to a certain extent; you have the car and you have some rather sweet ideas on how to use it."

"Oh, that." Budd inspected his stylishly scalloped fingernails. "I have to have a lot of research done, you see. I could have it taken care of easily enough, but news gets around, you know. You have all the facilities in your little undercover laboratories. If I work along with you, I can get it done right and fast. Particularly since you realize how much it will be to your own interest."

"What sort of research?"

"On the car, of course. You don't think I built it myself, do you? It was like this—I ran across a bright old fellow who had a few ambitious ideas along the lines of auto design. I asked him if he could build something like this baby of mine. He could and he did, but he was curious about why I wanted it and was fool enough to ask me some questions. Luckily for all concerned, he died of natural causes."

"You mean you just naturally slipped him a ticket out?"

"Something like that," said Budd carelessly. "Terrible, the filtrable viruses that can get accidentally into a man's air conditioning unit. Anyway, here I am with the car and no plans or blueprints of any kind. I'll have to get it to someone who can knock it down and duplicate it. That's up to your boys."

"I see. Is the car really on the up-and-up? I mean, have you tested it?"

"And how." A gleam of enthusiasm crept across Budd's deadpan face. "Come on—let's get out of here. I'll show you." Eric paid the bill and they left. When they were seated in the big blue Carrington Budd said, "Oh—by the way. I can't show you any altitude yet. The one thing the old boy hadn't quite perfected was the Heaviside screen."

"He didn't?" Eric's face flushed with anger. "Damn it, what good is the car to us without that? You expect my technicians to build a Heaviside unit small enough to fit into this jellopy? Why, the smallest one ever built weighs more than three tons!"

"Take it easy, pal," soothed his brother. "There are a lot of new principles involved in this wagon. Your boys are pretty good—they ought to get a lead after looking over the rest of the equipment."

"I hope so. Damn that Heaviside business anyway."

"You ought to be glad that the layer's there, chum, and that science knows a way to synthesize one for spacecraft. Did you ever hear what happens to a man when he's exposed to unfiltered cosmic radiation?"

"I heard." Unaccountably, Eric Arnik shuddered. Budd started the car.

BIDDIVER was in that enviable state of inebriation in which he could not be surprised. When he threw the switch to get some music and nothing happened, he did what any trained driver will do—glance far ahead through the windshield to see if the road is clear enough to allow him to investigate his controls for a few seconds. Only there wasn't any road. He blinked carefully and looked again, and there still was no road. Just a blankness, with a silly little cloud in the middle of it. He suddenly realized that he was looking into the sky; but he was looking, not up, but *ahead* into it. He grunted surprisedly and hauled at the left chair arm. The cloud ahead disappeared and was replaced by a rapidly expanding relief map. It struck Biddiver as a little ominous; he pulled at the right chair arm until the windshield framed a horizon.

For no reason at all he was reminded of a satire, centuries old, which he had read, concerning a college boy who yielded to the temptation of his evil companions, drank a glass of beer and staggered out of the saloon with delirium tremens. "Been a good boy all m'life," he reflected bitterly, "because I couldn't afford to be any other way. And now—four drinks, an' this." He wagged his head, hauled back on both arms at once. When he saw the little cloud again, he let go and slumped down in his seat. He was quite convinced he was dreaming, but he didn't want to dream about a crack-up in a flying automobile, and he felt he would far rather bump the cloud. He went quite peacefully to sleep then, ignoring the new whispering voice that joined that of the speedometer:

"Four hundred twelve k.p.h.—"

"Altitude twenty-three thousand fifty—"

"Four eighty-three k.p.h.—"

"Altitude twenty-five thousand thirty-three—"

But he woke, completely sober, when the car hurtled through the Heaviside layer.

TWENTY MINUTES after the second Carrington '78 pulled away from the Purple Pileus, it swept back again and two men leaped out. One was flushed and one was pale, but both were furious. They pounced on the frightened doorman.

"Where's my car? What happened to the other Carrington?"

"Wh—Mr. Arnik, I—" His eyes bulged in terror. He had heard of the Arniks. "A gentleman drove off in it. He had only stayed a half hour or so. His car was exactly like—"

"That's what you think," spat Budd, hurling the man down the resilient plastic steps. The brothers went in and collared the bartender.

That worthy was a true philosopher; that is, his morbid view of life extended to himself as well as to his fellow man. He came along uncomplainingly when it was demanded of him, which was immediately after he had said that he had spoken with the man who drove the Carrington. They whisked him to Eric's shipping offices, into an inner room, and down an elevator whose entrance was under Eric's desk. Far underground he was seized by a staff of highly trained men who lived out their lives in secrecy underground because they dared not show their faces above.

The bartender was given four injections in rapid succession and for the next six hours was subjected to the most thorough of grillings. He was powerless to tell anything but the truth. Highly detailed information about the man in the other

Carrington was fed, item by item, into a monster card-sorting machine. His name; height; weight; probable age; dress; accent; timbre of voice; physical peculiarities; each of these was gone into with incredible nicety.

The machine dealt in probabilities; if a man of a given height and weight reacts in such and such a way to such a statement, uttered so, then he may have spent a specified number of years in any one of eight professions. Each of these was taken in order, compared with other characteristics, canceled out or in. Each result was checked and rechecked, compared with every other result. At the end of the grilling, the Arniks had a complete dossier on Biddiver, as well as a slightly conventionalized full-length portrait. Looking at it, they doubted that their machine was working correctly, but it hadn't failed so far.

"Well," said Budd, scratching his head, "we know what we're after. Where is it?"

"It's probably well out of the way," said Eric. He turned away to give orders about the disposal of the mindless wreck that had been the head bartender of the Purple Pileus. He would be found dead days later, after wandering through the city, starving because he was incapable of realizing it, freezing because he couldn't understand that he needed shelter. "You see," he went on, staring at the picture, "from what you tell me, the space-travel mechanisms on the car had their master switch where any other Carrington has its radio. This guy was apparently one of those people who can't breathe unless a radio's pounding their ear. Drunk as he was, you can bet that the first thing he did after he started the car was to turn on the radio. As soon as he did that, he took off. He hasn't crashed; I'd

have heard about it if he had. He hasn't been seen flying around, either. He must have gone—straight up."

"And the car isn't shielded against the cosemics. So—"

"So they probably got the rat. I hope."

Budd shook his head. "You can't count on it. What that radiation did to him depends on factors that no one's been able to chart. I hope it killed him. Maybe it didn't—but what's the difference? That car's as fast as anything in space. By this time it's reached terminal velocity and is 'way out of reach. I'm out an automobile, I guess. Oh, well. I should kick. At least I'm where I know my dear brother will look out for me." He smirked at Eric and the way he made an infinitesimal move toward his shoulder-holster and then visibly thought better of it.

"I can just barely stand you," gritted Eric after a taut moment. "Don't make it any tougher for me by your lip."

SOMEWHERE in space, a chrome and blue automobile raced the green light of Earth. Biddiver was quite dead now, if death is complete loss of personality, of human hopes and dreams and desires. There was another at the controls, certainly, one who moaned and gibbered and mewled at the stars spread about him, one who snatched and pawed at the sensitive, unprotesting controls before him. But it was not Biddiver, any more than the car itself was the ores and gases and fluids from which it was fabricated. The car was new, and even newer was the creature at the controls.

After those first mad moments, he quieted to stare with his new, scarlet eyes at the car, the dials and meters that now presented themselves

in place of the conventional dashboard that had slid up out of sight when the car had reached the thousand-k.p.h. mark. He fingered the upholstery with an animal's pre-occupied attention, touched metal and glass and fabric with listless hands. Then he looked down at himself, snarled, and began to strip the clothes from his body. He worked slowly, systematically, from his shoes upward, ignoring clasps and slides, depending on the invariable rule that each chain has a weakest link. His flesh had a greenish cast, and it puffed tautly everywhere except near the joints, which were all simply skin on bone. When he had tossed the last tatter over his shoulder, he put both hands to his head and wiped off his frowsy mane. The hair came quite easily off the puckered skull. He giggled then, and went to sleep for three Earth days.

"Who's The Fang?" asked Budd Arnik, a couple of weeks after he had bulldozed his way into the titular vice-presidency of Eric's shipping firm. "I've seen some sweet write-ups about him in the tele-facsimiles. He's a crazy Martian. He's an exiled scientist from another solar system. He's a refugee from a sunspot. Everybody has a different idea about him, except you. Seems funny, somehow," he went on, affecting the lightly sarcastic tone which he knew infuriated his brother. "The gentleman steals a cargo which is not aboard a ship, destroys the vessel, and leaves you with your pockets full of money. I wouldn't be curious if I didn't happen to know that you've made no big payoffs to anyone recently. If you'd hired the guy, it would have cost you plenty. If you didn't, why should he scuttle a ship with a nonexistent, heavily in-

sured cargo, and then announce to the Universe that he is The Fang and will be heard from again?"

"You found out about the payoff," growled Eric. "Why bother asking me any questions at all? Figure it out for yourself."

"I will," promised his brother smoothly. "Which reminds me—I have an idea that'll make us some money, if The Fang can be depended on to do a little more work for us. Can he?"

Eric hesitated and then said, "Pretty much."

"Ah," said Budd. "Well, you know that uranium mine on Pallas?"

"Mm."

"Well, there's a lot of money tied up on it. That uranium, you know, is about forty per cent 235. U-235 from Pallas supplies most of the System, since it's so easy to refine. There's still plenty of market for it, you know. Lucasium is more efficient, but it's a hell of a lot more expensive. Now—here's my idea. Just to see if The Fang has any kind of reputation as yet, we'll have him threaten the colony. We'll set a price—not too much; maybe they'll pay it—and tell 'em to set it adrift in space, static, right there in the Asteroid Belt. By the time it has moved more'n a couple hundred miles toward the Sun, it'll intersect the orbits of quite a few planetoids. One of our boys can be roosting there in a small ship to pick it up."

Eric sent him a glance. "Is that what you meant when you said you had imagination?"

"Yeah. Why?"

"I'm surprised, that's all. It's not bad. Let's get going."

In a very few days they had a ship outfitted. It was decided that Budd would take her out to the Belt. As

they stood in the control room just before the take-off, Budd asked:

"You're going to get in touch with The Fang?"

"I'm doing that right now," said Eric. "You are The Fang."

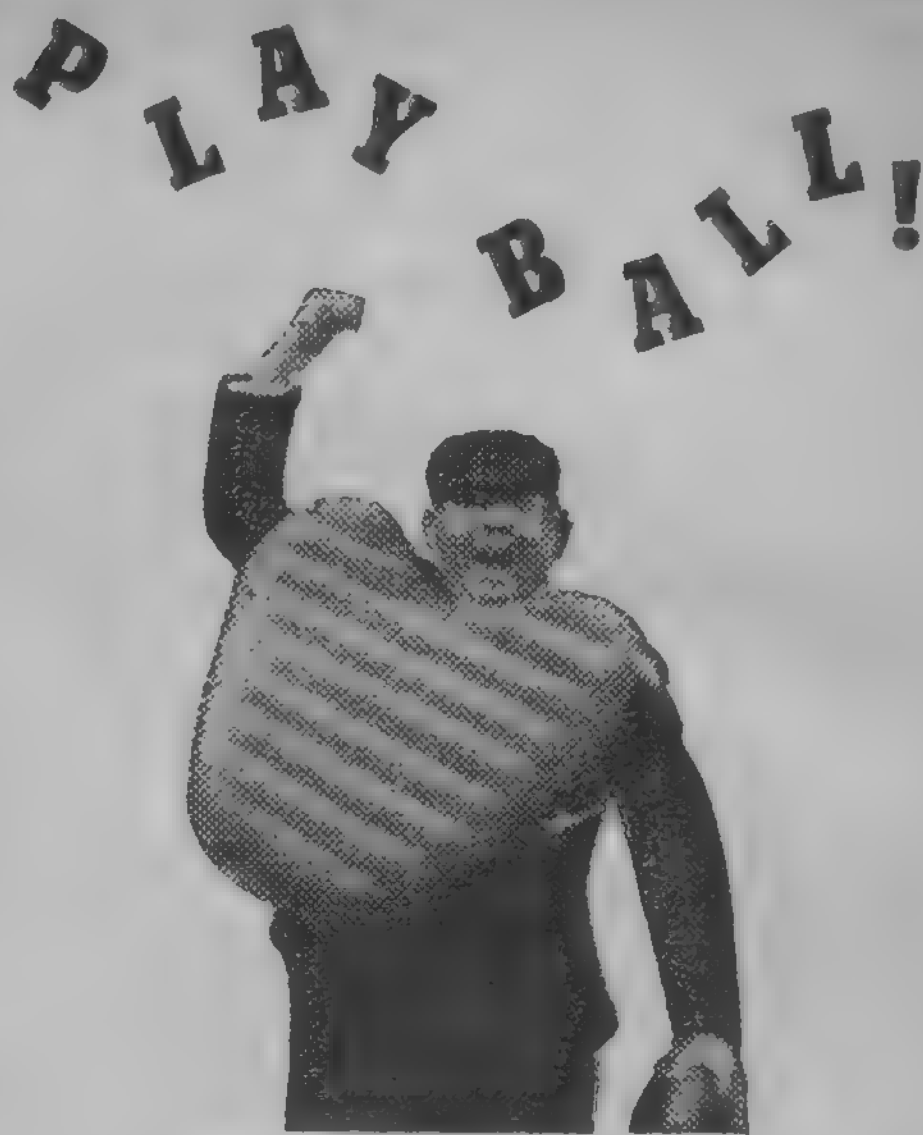
"I'm *what?*"

For once in his life Eric Arnik actually laughed. "Certainly. The incendiary explosion of the tankship was done by time bombs."

"But—that voice?"

"No trouble. It was recorded, and transmitted from little sets set adrift in space. Any signal transmitted simultaneously from three sources widely separated makes a direction indicator run around in circles." He chuckled. "One transmitter was dropped from the ship a day before she blew up. Another was in my office. The third was in an orbit around Eros. They were timed to transmit The Fang's message twenty days after the explosion, just about when it would be discovered. I told you you could have figured it out for yourself. All I had to do was to give my hypothetical criminal a name like "The Fang" so that the feature writers would pick it up and plaster it around. That's what you're doing now, dope. Just follow the course that's in the co-ordinator over there. The automatic releases will take care of everything for you. You'll drop atomic bombs in the path of Pallas, so that the asteroid will strike them just when its rotation will put the mines on the point of impact. The message is already recorded. Your course takes you within the gravitic field of Jupiter; one of the transmitters will swing around behind the old boy. One will be here, and one will be attached to the bombs."

Budd was aghast. "So that's—Holy Kitt! And I was the guy who said you had no imagination!" He looked at his brother as if he had



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It seemed to be an ordinary late-model car—but several million miles out in space, where no car could be!

never seen him before, and then something of his cockiness returned to him. "May I ask the master some questions?"

Eric looked at the chronometer. "Fire away. You have twelve minutes."

"How did the signal blank out all others in every ultraradio set in the System?"

"I can't tell you exactly, because I'm not a radio man. One of my boys fixed it up. The general idea is that every wave frequency has a corresponding negating frequency—another wave that vibrates node to

trough with the original, and cancels it out. My signals were transmitted in every frequency; they sounded above and below the ones that were canceled."

"How about the time lag between all those transmitters? They were an awful long way apart."

"A silly question, son. You know ultraradio. Those vibrations think the speed of light is a minus quantity!"

Budd rubbed his neck. "So I'm The Fang. I can't get over it. By the way, chum, I wouldn't try killing two birds with one stone on this

trip. You're liable to be the other bird. I'm talking to a buddy of mine every twelve hours, until I come back. If I miss a single call, those cans of film will get to the Feds."

"Damn it," said Eric mildly. He walked to the bulkhead, pressed a panel. A section slid open; he lifted out a compact little piece of destruction in the form of an atomic bomb. "I was hoping you wouldn't think of anything like that," he said. "This was for you. Oh, well."

Budd grinned. "Better luck next time. So long, pal. See you anon!"

When the air-lock gates had hissed to a close, he threw a master switch set into the chronometer housing, lit a cigarette and sat down to read and look at visirecordings until he had something to do. The chronometer clicked softly, and the ship hurtled away. It was only then that a certain detail occurred to Budd—namely, that whether or not the miners of Pallas and their paymasters agreed to The Fang's terms, they were doomed, for the eggs would be laid. Their planetoid would strike the hovering nest of bombs when, in all probability, they would be looking for some sort of an attacking ship. Now, what was the good of that?

He reflected a moment, and then laughed aloud. This was all that the System needed to learn that The Fang was a force to be reckoned with! Budd had the bright ideas, but it took a brain like Eric's to really stretch them out. After this, The Fang could dictate to the Universe.

"My own brother," Budd chorled. "But, oh, Lord, what a man!"

He had changed; he knew that. The tearing radiations that had thrust his new being into the Sys-

tem had left him memories of puffed green flesh, bony joints, and a bald, rough skull. The transition was complete now. Blue-white hair covered the obese body. It was a good three feet long and beautifully silky. It fell down on each side of his scarlet eyes, down from his cheeks, his chin. It mantled his whole frame, ending in a great puff at his knees. The erstwhile chitinous structure of his fingernails was now flexible, sentient flesh, so that, from the tip of each finger and thumb a dexterous tentacle about four inches long extended.

It was a new and glorious world that this creature regarded. To him, radiant heat was a color, and electricity was a color, and every vibration between them on the electromagnetic spectrum was a shade. Thought itself was a visible, physical thing to him. Thought strikes the average telepath like a hand on the arm of a paralyzed deaf-mute, but to the creature in the Carrington it was as easy to sense as the handshake of a friend.

His interest in the interior of the car was soon exhausted, and he spent many days drinking in the immensities of space. He looked with understanding and the truest kind of appreciation on mighty Jupiter and the speckled Belt. His eyes sensed rather than saw Neptune and frozen Pluto. Then, having had his fill of infinity, he turned again to his small world and himself.

He regarded the car and its workings not with the eye of science, but with that of the most superb logic. The ape regards three turns of rope around a beam as a Gordian knot. A lay human being regards an atomic power plant as a hopelessly involved technical jumble. Not the silver-silk being in the Carrington, however. He crawled into the power

compartment, and with the joy of a man who has just found a book he loved in his childhood, he followed leads, inspected coils and bars and casings. In a locker he found tools of every kind, spare parts of every description, and with them he went to work.

The powerful and delicate tentacles at his fingertips worked with a speed and precision impossible to a human hand. Here he found a bus-bar a few millimeters too thick for the light load it carried; there he saw a mechanical task which could be performed electrically with less drain on the power source. He looked carefully at the wheel-driving mechanism, and after an hour's work on it, went forward to the control chair and re-calibrated the throttle indicator; for now the machine could not be operated safely on the ground unless it drew less fuel, due to its new efficiency. He regarded the antigrav apparatus with some amusement, for it seemed primitive to him. Hooking his leg around the wheel driveshaft, he drew a set of tools equipped with spring clips toward him, shut off the unit, and rebuilt it.

The car kept him busy for some days, and then there was little else he could do to it; and so he turned his brilliant eyes inward on himself. He was a creature without precedent. Of the human basic urges, he had none. He could not know hunger, for the car supplied him with food tablets as they were needed. Fear did not exist. Wealth, power, shelter—these things were impossible conceptions, for he had been born with them all.

He remembered little or nothing about Biddiver. He sent his metrical mind back along the past few days, searching for clues as to his origin and that of the automobile.

Almost all of it had been blanked out. There was, however, a recent experience—a voice had spoken to him, and he had thought it authoritative. He knew himself to be talented and superior, for had he not improved on the work of a people who manifested a high degree of scientific knowledge? Then the words he had heard from that source must be the thought-image of a Power past even his understanding. If he could only remember when—and where—

That voice had said, "Guys what don't want to do nothin' to nobody most generally don't amount to nothin'. Big shots—every one of them walked up to the top on other guys' faces. The Fang—at the top now." There were details about The Fang; the creature suddenly found it difficult to remember whether he had heard of or been The Fang. "Arnik . . . Arnik brothers—" That was a recurring thought-pattern that brought with it a wondering distaste. There was more, but it was these things that were most significant. Why?

He opened his eyes and stared through the windshield. All of it had something to do with the third planet, the green one. There was a message for him in that voice from the past. He set about the problem as if it were put together with nuts and bolts.

Arnik—big shots—these, and the things about them, were somehow unpleasant thoughts. There was pleasure, however, in improvement. Unpleasant things were made pleasant by improvement. The Arniks, then—

He paused. Everything about him—the car, the stars and planets, the food he ate and the air he breathed, each of them had a purpose. But he himself—why was he

there? The speedometer was there because it had something to do—a function. Had he a function? He must have, he reasoned, or he would not be there. He regarded the green planet thoughtfully, running his pointed yellow tongue over his lips. Where it parted the long hair, two great white tusks showed. He laid his hands on the arms of his chair, and the tentacled tips curled over the ends, lightly touching the controls. He knew what he had to do.

And that is how the philosophy of a bitter bartender became a space-dweller's driving creed.

BUDD ARNIK found time a little heavy on his hands until his ship approached the Belt, and then he spent most of his time at the forward port. He dared not touch the controls, for his course was timed and plotted and automatically steered, and a fraction of a degree one way or the other would defeat the whole plan.

Power off, the little ship swung into the Belt and into the orbit of Pallas. Then a few gentle nudges this way and that, to brake her and steady her in that untenable position, stasis in space. The most advanced of calculating machinery had been employed to check this one tiny dot on the astro chart. She hung there for twenty-two hours, awaiting just the right split second to drop her deadly load. Budd only felt the infinitesimal lurch because he had waited so long for it—that tiny swaying as automatic grapples let the bombs go, repelled them a few feet so they would be clear of the mass of the ship. Then the artificial gravity and momentum neutralizer cut in, a relay clicked, and the ship looped over and fled back toward Earth.

Budd slipped into the pilot's chair

with a sigh. This leg of the trip would be a little more exciting. Although the automatic pilot would take him unerringly back to his starting point, the explosion on Pallas would occur long before he got there, and space would be crawling with Tri-planet Patrol ships. He knew he could outmaneuver and outrun any of the ships, but he knew he wouldn't have a chance against an ultraradio torpedo or a sleep-destroying field. Particularly the latter; for the range of the field was tremendous, and the penalty of being snared in one was agonizing death from lack of sleep. He had to rely on his detector beams to warn him of any approaching ship.

He slept frequently for lack of anything else to do, woke for a few minutes, checked over his gauges, and dozed off again. And in one of these periods he dreamed.

He dreamed that a hollow, insistent voice, just like that of The Fang on Eric's recordings, was calling him insistently. "Arnik! Arnik! Arnik!" He was conscious of his own effort to rouse himself, and found he could not. "Arnik!" said the voice. "Answer! What are you doing? What was the meaning of those bombs dropped in the path of Pallas?"

And he dreamed that he was bound down by gentle but irresistible forces, so that he could only cry out against them; but the only cry he could make was the truth. "We are bombing the mines."

"Why?" The voice was a glittering steel probe, picking away at his brain.

"To create fear of The Fang. To make The Fang's commands law."

Question by remorseless question he was forced to tell the whole story. And then, suddenly, he found himself free to awaken. He sat bolt upright, streaming sweat, sputtering

profanity, and carrying the most terrific headache in the memory of man.

"I'm gettin' the crawlin' willies," he muttered, and then realized that the detector alarm signal was shrilling. He glanced at the dial. It had been ringing for two hours and twenty-seven minutes. He shook his head, nearly shrieked at the pain, and snapped the switch. The signal cut itself off. From another dial he read the bearing and distance. He swiveled about, unlimbered a short-range visiscope, and turned it on. Sharp and clear, the image of the offending vessel showed up on the screen.

Only it wasn't a vessel. It was an automobile—an iridescent blue Carington '78.

BUDD ARNIK grunted, looked again and grinned. "Well, well," he chuckled. "Imagine meeting you here!" It was a one-in-a-quadrillion chance, he thought. That ugly-looking lug who had accidentally swiped his car had probably gone nuts and died when he broke through the Layer. By some fluke the car had quit with a corpse at the controls and must now be caught in somebody's orbit—probably old Jupiter. And of all people in the Universe, he, Budd Arnik, had to be the one to find it!

He cut off the automatic pilot and took over, swerving toward the car. It was traveling in the same direction but in a slightly different plane. He focused the visiscope and read off the range from the gauge. The car was nineteen kilometers ahead. He put on a burst of speed, overtook and circled the automobile. As far as he could see, it was totally unharmed. He grinned happily, edged closer, and reached for the magnetic grapple control. But before he could

touch it, the car suddenly faded away from the screen. Budd swore and fiddled with the controls, bringing it quickly back into focus. It had jumped four kilometers when he came close. He crept in again, watching carefully. When the range closed to one kilometer, the car jumped again. Budd frowned. Was that dope still alive in there?

He lifted his ship above the car and began to settle down toward it. And again the car jumped away. "What the hell," growled Budd. "If he don't like me, why don't he turn tail and run?"

He tried it again, and only then did he think of a repellor field. He hadn't known that the car possessed one, but then there were probably half a hundred gadgets on that wagon that he knew nothing about. Most big spacecraft carried such fields in case of emergency repairs in space, to guard the hull against small meteorites when the ship was not able to navigate clear of them.

Budd shrugged. "There's more ways of killing a cat than stuffing it in a knee boot," he growled. He took some sights, punched cards with the results, and fed them into the co-ordinator. When he had his position, he lined his ship up with the car on his course, and moved forward. The car leaped away, and Budd followed grimly, the car preceding him exactly a kilometer ahead. The two crafts soon attained their terminal velocity, and Budd turned the controls over to the mike.

He walked over to the ultraradio, noticing that he was an hour or so late for his usual communiqué to Eric. That gentleman's face flashed furiously on the screen. Budd smiled back at it.

"Well?" roared Eric. "What the hell have you got to be so happy



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about? Why you double-crossing rat!"

"Easy, pal," soothed Budd. "I been busy. I've got a present for you."

"Take your present and ram it up—"

"*Tsk, tsk,*" tsked Budd. "All this excitement over a little tardiness! Listen, goon. Remember that car we had swiped from us at the Purple Pileus?"

"Yes, I remember and I don't give a damn about it."

"No? Well, give a look!" Budd walked away from the radio, switched on the visiscope. "Can you see what I've got in tow?"

"No, I can't. Now stop your hogwash and tell me what sort of monkey business you're up to!"

Budd sobered. "What are you talking about?"

"Don't play innocent," snarled Eric. "What was the idea of blanketing *my* signal?"

"When? What signal?"

"The F—" Eric stopped apoplectically, remembering that he was on the air and that the System was full of ears. "The signals we arranged," he said, as if talking to a four-year-old. "Remember?"

"Yeah—"

"They were blanked! The one in my office, I— Hey! You don't really mean to tell me that you actually *don't* know what happened?" He peered out of the screen at Budd's amazed face, rubbed his ear, and went on with a desperate sort of patience. "O. K. then. My transmitter was blanked, and so were the others, apparently. Instead of that, I got *this*!" His face disappeared, and a recording screen was shoved up against the transmitter. "Now watch!" said his voice, and the recorder glowed. It showed a typical radio show, a dancing

chorus, a vapid female singing dourly. Suddenly the scene disappeared and a truly terrible voice rasped forth.

"I am The Fang," it said melodramatically. "I have come again to warn the world. But not, as was expected, to warn you of myself, but of my masters."

There was a long, significant pause. Budd's throat felt very dry.

"I was ordered to destroy the mines on Pallas. I have disobeyed, for my masters want power they cannot control. I also warn my masters that I will not rest until they are as I am!" With the last two words, the screen came alive with a picture.

"God!" said Budd, his eyes bulging.

The screen went dead and was moved away. Eric's face reappeared. "There's something for you to look forward to," he said snidely. "Hurry home, babe." He signed off.

"The son," growled Budd. "He looks almost happy about it. Great sweet sidesway what a face!" He slumped into a fearful heap in the pilot's chair.

As Budd expected, the car's repellers cut out when it had been shoved well within Earth's gravitic field. He grappled it to his ship's side and landed neatly on the stage in front of the Arnik Shipping Co. His first act on alighting was to release the car and try the door. It opened readily. He recoiled a little at the heap of rags that littered the stained control seat, and then he shrugged and climbed in, kicking them out—the rags, and the odd bones they covered. Budd Arnik wasn't picky. As the ground crew disposed of the spaceship, Budd tested the controls. They seemed

to be all right. He waved to the foreman and the car slid smoothly down the ramp.

He could have taken a solenoid car out to Eric's place and saved twenty minutes, but he was too tickled at having got his car back. He swept out of the city, lulled by the whispering speedometer; and when he had the highway to himself, he leaned over to the conventional radio switch and then pulled back on the arms. The car soared up effortlessly. He put it down again and raced to his brother's place.

Eric was waiting fretfully at the door. "Dammit, why didn't you take the solenoid?"

"Brother," said Eric easily, "when you've spent as many weeks as I have being toted around by a machine that did your thinking for you, you'll be glad of the chance to be the boss for a change."

Eric stared over his shoulder at the house, shrugged nervously and climbed into the car. "Place gives me the jitters," he complained. "Go ahead then—drive. I want to talk to you."

Budd wheeled the Carrington around in its own length and rolled onto the highway. Drifting along at a hundred and eighty, he turned to Eric. "What's this about jitters? Something new for you, isn't it?"

Eric looked sheepish. "Yes. No." He swore fluently. "Budd, you're a phony. You're in this up to your neck." He sent a glance Buddward from the corners of his eyes. "And I don't know that that isn't the silver lining they told me about in school, come to think of it. If I get it, you'll get it, too. Anyway, you're a phony. You're up against something you can't laugh off, this trip."

"You're talking a lot of non-

sense," said Budd. "You're all shot, man. I've never heard you go on like this. What's under your skin?"

Eric began in a low voice that got increasingly higher and hoarser, until he wound up in a piping whisper. "We create, for our own ends, one master criminal. Said master criminal consists in ultraradio transmitters set adrift in space and in time bombs. We do one little job with our hypothetical criminal's aid. We start another one. Our make-believe monster promptly goes on strike because he doesn't like our greed. And you ask what's under my *skin!*" He gasped for breath, then went on, in a crazed monotone, "And I've been having dreams. Dreaming with my ears and my eyes while I'm wide awake. I hear that . . . that *thing* laughing. I keep seeing that face. That's what's going to happen to us, you damn fool; don't you see?"

Budd went right on grinning; then Eric suddenly realized that the grin was frozen there. Budd said hoarsely, "Yeah. I know. I heard things, too. Merciful heavens!" he burst out. "We can't let it get us! Shut up about it!"

Eric's gaze dropped between his feet. He clamped them nervously, held it there. "If it was anything we could understand, we'd know what to do . . . but you can't tell about those things. It might hit you one way, me another, and yet we're brothers. You just can't tell. Anything might happen—" Eric, due to his morbid attention to his feet, and to the artificial gravity in the car, did not notice Budd's turning on the radio, or the swift leap of the machine off the road. "Who can tell what it did to that ugly Biddiver fellow? How can we know what he is now? You can't predict anything, you can't even guess—"

"What are you talking about?" snapped Budd.

"Biddiver—the guy that swiped your fancy car by mistake. Biddiver—The Fang."

Budd's face turned a sick gray. "Biddiver is—The Fang?"

"Certainly. That was easy enough to find out. He's altered—God, yes; but it's him, all right. Didn't I tell you? I guess I forgot. I'm shot to hell." He shook his head, and sweat flung from his forehead. "The card-selector—you know, the one we used on that barkeep. It gave us a portrait and a description. With The Fang I reversed the process. He's slightly changed, but underneath all that . . . that fur—he has the same bone structure. It clicks . . . it couldn't be anyone else. Somewhere he's cruising around in that damned automobile. Sooner or later, he'll get us."

"Not 'that' damned automobile," said Budd, and laughed hysterically. "'This' damned automobile. I tried to tell you about it when I was out there in space. I thought I picked it up and brought it back. I see now—it brought me."

Eric raised his head, stared out of the side window, and screamed. The Carrington was a thousand kilometers up and going higher. Budd forced the control arms downward violently; the nose of the car tipped up instead. He sat like a statue, blood pouring from where he had bitten through his lip. Eric dove for his gun, snatched it out, put it to his temple.

A WHITE-FURRED arm reached almost casually from behind them, lifted the gun out of Eric's hand. "Don't do that," said The Fang gently. "Not at this stage. I want

you changed. I want you made like me. That," he added, "is what I am for."

They turned slowly and faced the creature. "Do not be frightened," droned The Fang. He was regal, magnificent, as he stood there, in front of the door to the power compartment where he had been hiding. His luminous eyes were separately articulated, and one fixed on each of the men, held them. His long face hair was swept away on each side from his chrome-yellow mouth, barring the great tusks.

He held them there while the machine swept up and outward, the whine of air outside growing fainter as the air thinned. Stratosphere—ionosphere—and the Heaviside. The Fang watched with puzzlement growing in his eyes as Eric shrieked and died, as Budd groveled in pain and then hung limply on the back of his seat. The Fang picked him up carefully and laid him on the deck. Something was happening to the man. He tried to scream, and his legs kicked out. He tried to strike out with an arm, and his head whipped back against the floor. His eyes widened, the flesh between them thinning, the eyeballs beginning to fuse. He died, then, for no human being can live when his medial division starts to go to pieces. Humans are built to operate with two sets of limbs, two eyes, two ears, two nostrils—the radiations found that the path of least resistance in Budd Arnik was to do away with that medial line, and it couldn't work.

So The Fang was left, keening over the twisted bodies, mourning that he had not done it the right way, horrified because he had been mistaken—for he only wanted to help. Perhaps one day he will find his function.

THE END.



BRASS TACKS

Reader reactions aren't accurate enough in themselves to make such a job of statistical analysis worth while. But I'd like a 1941 Lab for the year.

Dear Mr. Campbell:

Acknowledge receipt of yours of the 18th inst., with bombshell inclosed—bombshell being the unexpected *Nova* "Universe." What a story! And what an issue! Man O man!

My ratings:

1. "Universe"—Heinlein—A+
2. "Solution Unsatisfactory"—McDonald—A
3. "The Stolen Dormouse"—de Camp—A
4. "Liar!"—Asimov—A—
5. "Fish Story"—Phillips and Roberts—B
6. "Jay Score"—Russell—B
7. "Subcruiser"—Walton—B

Only after an agonized soul search did I make up my mind to put de Camp's serial in third place—it's wonderful. But the two novelettes are even better. Nos. 5, 6 and 7 are practically tied.

Rogers again proves his merit; Schneeman excels except for his too-blurry charcoal work for "Fish Story"; and Kramer, amazingly, is just as good.

I have decided to standardize my rating system to compare stories of different months, instead of merely rating the contents of each issue against itself. Stories marked "A" range from *Nova* level down

a ways; those marked "B" are almost as good; C's don't belong in *Astounding*, and D's don't belong in any science-fiction magazine. Those last are rare.

Far more important than my personal statistics are your averaging methods in the Analytical Lab, and I have an idea for them, too. I realize that if my way is any good it's probably the way you're doing it now, but, unabashed, I proceed with the explanation.

Suppose an issue contains four complete stories, one serial and one article. As I understand your present system, anyone rating all of them has the one at the top of his list counted 1 and the one at the bottom counted 6. Anyone not rating serial and article has his marks spaced from 1 to 4. That's the problem.

Now, if someone ties a short and a serial for first place, the next one in his list is in the No. 3 spot; therefore each of those he tied has to count 1.5, otherwise his opinion is being given more weight than that of other readers who might put one of the stories lower. That's obvious.

Your main problem works the same way, and the objection to your system is the same as the objection to counting both the tied yarns as 1: one reader's opinion affects the final result more than another's. Why don't you solve it in the same way? In the example I gave, a Brass Tacker who saves the parts of his serials has five stories

down. Count his selection for first 1, and his last-placer 6. His second-placer would then be counted 2.25; third, 3.5; fourth, 4.75. If someone leaves out the article, too his stories count 1, 2.67, 4.33, and 6.

Then, if D is the difference between the value assigned to one story and that assigned to the next, in one reader's rating; t is the total number of contributions being considered; and n is the number included by the reader in question, you have:

$$D = \frac{t-1}{n-1}$$

After performing this formidable calculation, find the Analytical Lab average for each story independently, in the way you described in the December number.

Ye gods, what arithmetic that involves! But it seems the only way to arrive at a fair result.

While we're on the subject, are you ambitious enough to compile an Analytical Lab review of 1941? You could mention it in about the November issue, and should get sufficient response. I don't remember what Brass Tacker suggested it, but I'm in favor of the idea.

Leaving the subject of statistics, whose very contemplation renders me brain-weary, I turn to the Heinlein future history. No, I don't either. This is far too long already and I still have a lot more to say.—Chandler Davis, 309 Lake Avenue, Newton Highlands, Massachusetts.

Many did like "Magic City" a lot. The point is not that the story was disliked; readers seem to like other types more.

Dear Mr. Campbell:

The reader response to Nelson Bond's "Magic City" came as a distinct shock to me. I found it one of the finest in a year of fine stories. My own copy of Astounding is dog-eared with lending, since I found that particular yarn too good not to share.

There is power in that story, based as it is on the universal striving of man to understand and conquer disease and death. And there is quiet, satisfying humor in the half-understood names of places and things; the innocent false association of ideas.

It is interesting to note that in developing many of his words and place-names, Bond has followed the laws of philology.

His future-time words bear the same relation to modern English that, for instance, modern French words bear to classical Latin.

The half-dozen borrowers of my Astounding were all people unfamiliar with the magazine, but fond of the science-fiction of Verne, Wells and Huxley. In each case, I received thanks for an introduction to your book, and particular praise of the Bond story. One reader bought three more copies to send to friends.

Well, that's all. I'm sorry your correspondents didn't like "Magic City," and I hope you hear from more like me who did.—William Bradner, Jr., 213 Wellington Rd., Jenkintown, Penna.

New fan club.

Dear Editor Campbell:

Here is an important announcement to Astounding fans in northern California! The Golden Gate Futurians are looking for new members, meaning *YOU*, the reader. Been wanting to catch up on back Astoundings? Here's your chance to delve into the club's library of over one hundred fifty magazines and books, many of which are rare back issues.

The Golden Gate Futurians meet every second and fourth Saturday of the month and new members are cordially invited to meet and mix with the present twenty. The place is 831 Central Avenue; the time is 7:30 in the evening.

Besides the library and interesting discussions, there are neat membership cards, stickers beautiful, a club publication, original illustrations, auctions, debates, questionnaires, programs, refreshments, and so on. Meet the gang—talk shop. All of the guys and gals have a marv'lously scrumptious time.

Many are the authors, artists, fan editors, leading fans, glamour gals of fandom, and interested science and fantasy-fiction fans. Weird ones, too.

We have dances, picnics, parties, socials, visits, and such, of all descriptions lined up. Come on; get in the fun. A group of us are going to the 1941 Denvention—the next Stfvention will probably be held here in Oakland and Frisco!

Write to my address for information, or phone ANdover 2559.—Joe J. Fortier, Director G. G. Futurians, 1836 39th Avenue, Oakland, California.

MacDonald, a first-rate scientist is also a professional politician. His opinions are scientifically accurate. He has performed the actual experiment of doing some actual administrating instead of simply arguing about it. Your suggested solution has one major hole. Readers can point out others. How do you plan to keep peace until that re-education is completed?

Dear Mr. Campbell:

I have always been an exponent of future sociology yarns in Astounding as well as those efforts for a future history along logical lines. Thus the chart in the May issue showing how the chronology runs of Heinlein's stories was certainly welcomed by me. I suggest that the gaps in the era covered so far be filled as soon as possible, not only by the yarns suggested in parentheses but by many others. After that how about a compilation in book form of the history? I'm pretty certain that with the right advertising it would really sell.

Now for the challenge to solve the problem of "Solution Unsatisfactory." Mr. McDonald may not like my answer, and I welcome a heated discussion with him in Brass Tacks. Let me first set forth the basis for my solution. Mr. McDonald thinks little of participation by the scientist or technician in the social field. We see from "Sixth Column" that he has the chief scientist make silly suggestions continually, get a dictator complex, and go crazy. He praises the "play by ear" method of the politician as superior to any other practical way of handling administration. I disagree with him here quite a bit. It seems to me that the true scientist has a set of social values greatly superior to that of the average politician and that he has the welfare of his nation's people as well as that of the human race in general in mind far more than any other group. A scientific democratic administration would not have let the secret of the radioactive dust be turned over to any other nation, no matter what her predicament or its sympathy for her. It would have worked industriously on perfecting air conditioning apparatus designed to eliminate the dust from buildings and would see to it that they were installed throughout the nation. It would maintain a solid air defense over the whole continent that would take care of any foreign air armadas. The government would supervise all work with radioactive elements. Also it is faulty to say that no practical defense would ever be found for this or any

other weapon. There may be found something that will stop radioactivity quickly. Maybe McDonald's magneto-gravitational field might help. But where there's a will there's a way!

Now I know that what I have written already is quite full of holes. Let's do a bit of plugging. It seems strange, but I have heard of or read a few science-fiction stories that don't take it for granted that a scarcity medium of exchange is in use and don't talk of spaceships and atomic control in terms of dollars and cents. Is an economy of abundance so fantastic that the authors pass it by? By abundance I mean goods and services in such an abundance that they no longer can be distributed by their relative scarcity. But American machine technology has almost brought about that condition here in North America. There's your basis for depressions and unemployment. That's why they kill the pigs and let the oranges rot. An administration of an economy of abundance can hardly be effected by our present governmental set-up, designed for scarcity. The former can insure far greater civil liberties, can eliminate poverty, crime, and unemployment, can cut down the duties of administrators to establishing details of national policy as regards foreign nations and to checking up on the efficiency of the productive and servicing equipment, personnel, and promotion and demotion according to a huge merit system-civil service set-up. Education on a psychological and semantic basis can adjust America to this new environment. Intellectual evaluation by one's fellows along with position in either industry or service can provide incentive for great striving. Purchasing power would be plentiful and equal on an energy basis for the same reason that anyone can have all the air he wants today. You may recognize this as Technocracy already, Mr. Campbell, and that assumption is quite correct. The organization behind this movement has plotted to blueprint detail a peaceful progression into true scientific democracy. A technate could instill such a set of social values into its people that no one of them would want to try to gain autocratic power through the use of such a super weapon. The administrative scientists in control would have absolutely no desire to cover the world with death for any purpose. Abundance breeds manners as no other teacher. Thus scientific control with the welfare of the people foremost and a semantically educated populace that has been taught to work for a future of freedom and

abundance will be able to control such a weapon and defend itself from attack by it. Incidentally this continent can be easily made a self-sufficient economic unit with synthetics for rubber, tin, and manganese if necessary and thus a final blackout for Europe or Asia would not damage us too.

We all like to read science-fiction. How about living its most pleasant speculations?—Franklyn Brady, 140 So. Maple Drive, Beverly Hills, California.

"Fish Story" got a curiously mixed reception. Some liked the "tall story" variation—some seem to object strenuously.

Dear Mr. Campbell:

Perhaps you'd be interested in the feminine reaction to your essentially masculine magazine. My favorites are the "cuties" and the "quaints," the sociological and psychological stories, all the serials, in fact, everything but the monthly "stinko" (why must there be a particularly bad one every issue?) and that story that the boys tell over and over about the spaceship that needs fixing in a hurry or everyone aboard will die.

This last issue was excellent. "Universe" was Heinlein at his best; "Stolen Dormouse" was next with de Camp at not quite his best; then "Solution Unsatisfactory," leaving me slightly dizzy, and next "Liar!" and "Jay Score." The monthly stinko was "Fish Story" and the gotta-fix-the-space-ship story was told again and labeled "Subcruiser." I missed the article this issue. Please don't forget again.

Without hunting through the old magazines to check, I think my favorite story has been "And Then There Was One—." And stories I liked and remember are Bond's story about the Venusian bunny and his pet Ampie, and that Roman candle story, "Masquerade." All the serials have been "best" except the Triton story. The second half was poor. But "Slan"! Ditto on all the superlatives that have been used by editor and readers to describe it and a few more besides.

The inside illustrations are usually pretty bad, but the covers are good. Favorites are the Triton cover and the one for "Magic City." Oh, yes, and that one with the Disciple of "Sixth Column" on it. Among the inside pictures that have been good are the ones for "Stolen Dormouse" and for

"Butyl and the Breather." The latter was so good that I could almost smell that stink.

You put out a good magazine, Mr. Campbell, a very good magazine. But, please, if there must be a bad story in every issue, please let it smell only slightly. Because that otherwise good February issue had to be buried in the backyard. It contained "Trouble on Tantalus"!!!!—Martha Benson, 540 East 102nd, Seattle, Wash.

Schneeman's in the army now, sorry to say. He's doing air corps photography at Lowry Field, Denver.

Dear Mr. Campbell:

After many hours of thought, I have finally decided to write a letter to you in compliment of your marvelous mag. You have achieved a new high in stf by the printing of such stories as "Sixth Column," "Slan," "Galactic Patrol," "Cosmic Engineers," et cetera. This it is that has decided me to put Astounding at the head of my list of stf publications. I think any fan in his right mind will follow suit.

Another thing that has rated you so high is your illustrations. Where did you ever get that Rogers? You really caught something when you got hold of him. Schneeman is a wizard, too. Those pictures of his put me into fits of rhapsodical madness. I rush about the house showing them to everybody in sight.

Last but not least comes the variety of stories that you manage to get. You have a pure science story and then a sociological legend. I am sure that this has a lot to do with your top position.

Here are my ratings for the May Astounding:

1. "Universe." I rate this first because of the way Heinlein told it. In my opinion this is the best of his yet.

2. "Stolen Dormouse." This is the most completely dippy, dopey, dumb, crazy, lunatic serial or story I have ever read. Written in de Camp's illimitable style it makes swell reading.

3. "Solution Unsatisfactory." Because of its grim reality.

4. "Liar" and "Jay Score." Because of their human interest.

5. "Fish Story" and "Subcruiser." I could not bring myself to put one of these last.

COVER—Swell.—David G. Miller, 909 West Duval, Lake City, Fla.

*Astounding books are being considered,
but no decision is possible yet.*

Dear Sirs:

This is another of those first letters of which one sees so many. Although I have read *Astounding* for more than two years off and on, I recently woke up to find that it was the best in the science-fiction field. Now I buy it every month.

Now for the May issue of your magazine. In my opinion, the stories rate as below:

1. "Solution Unsatisfactory"
2. "Universe"
3. "Jay Score"
4. "The Stolen Dormouse"
5. "Subcruiser"
6. "Fish Story"
7. "Liar!"

"Solution Unsatisfactory" and "Universe" are both excellent stories from excellent authors. "Universe" left itself wide open for a sequel, which I think would be very much in order. "The Stolen Dormouse" did not live up to the expectations I had. The first installment gave a basis for a story which I think could have been played up more. I still don't know what subspace is according to Mr. Walton, nor did I get a very good explanation as to how the ship's machines operated and what their purpose was. Those are the kind of things that I like explained in a story. "Liar!" could have been left out entirely without hurting the magazine any.

There is only one other thing that I have on my mind right now. That is, would it be possible to have "Slan," "Gray Lensman," or "Final Blackout" printed in book form, or would it be impossible to have any two of them combined? I would really like to have all three of them printed, but I realize that would be too much for one book. Even being put into one of those 25c pocket edition books would be all right. How about it, huh?—Bill Donnell, 15 Fourteenth Avenue, San Francisco, California.

In that case telepathy would be no good at all.

Dear Mr. Campbell:

I have just belatedly read your "Interpreters May Still Be Needed" in the June

Astounding, and, while I am compelled to concede your main contention that the use of analogy by peoples of radically different environment would probably require elaborate explanations, still I suggest that such explanations could be made in a series of mental pictures quite divorced from terminology.

Thus, your legendary hero Ubgloo would have to be pictured in all his joy as he rushed to remeet his fifteen wives; to be followed by a picture of the telepathic invited guest himself imitating the joy of Ubgloo as he pictured himself "accepting the invitation to the reception, et cetera"—but the end-product would be entirely clear to anyone at all capable of imagination—or "image-making" in accordance with mental patterns provided telepathically.

The point impressed itself on me, because all my many personal experiments with telepathy have led me to the assured conviction that ONLY mental images—never (by other than pure chance) WORDS—are conveyed from mind to mind without the use of physical, or, at least, what we term "normal" physical means.

It is true that abstract ideas can be so conveyed, but they will always be reproduced—at least in my case—in my own conditioned word-patterns, never in those of the "sender."

Is it really natural for us to think in words, or is that something we have very painstakingly learned to do in order to facilitate the exchange of ideas with our fellows? Perhaps we think only in pictures, and our "education" consists in learning how to turn those pictures into arbitrary word symbols? In other words, perhaps the true "thinker" simply REFLECTS—as a mental mirror—and then has to convert what he "sees" into arbitrary symbols.

It is so natural for us to think in words, that we tend always to express ideas received telepathically in the same medium, but in our own habitual word-forms, so that we tend to overlook the possibility that no words at all, but merely sense impressions, were implied in the original "message."

The whole subject is intensely interesting, and I am almost sure that the telepathic "power" CAN be developed and greatly increased by experimental verification. The subject has not yet received a hundredth part of the "scientific" attention it deserves.—Charles Henry Mackintosh, P. O. Box 744, Daytona Beach, Florida.

BOOK REVIEW

HOW CAME CIVILIZATION? By Lord Raglan; London, Methuen & Co., Ltd., 1939, 191 pp., 6 shillings.

Lord Raglan, author of this and other books on anthropology, is said to be a retired empire-builder. To judge from his books, he is a hard-boiled materialist and logician whose peppery personality sometimes causes him to make categorical, dogmatic assertions that such-and-such is so, when the evidence indicates merely a fair probability.

Now and then, it seems, he becomes exasperated with some widely-held opinion which he considers illogical, sentimental, or mystical. He sharpens up his snickersnee and goes after that school of thought with horse, foot, and artillery. In "The Hero" he set out to demolish the idea that culture-heroes like Odysseus, King Arthur, or Cuchulainn had a historical basis, and did a fearful job of demolition. Now he has gone after those who believe in the independent invention, in different cultures, of the components of civilization.

The book thus advances the extreme diffusionist point of view. This leads to some remarkable conclusions. He attacks the idea held by many of us, of the industrious savage struggling toward civilization, inventing here and there like the rest of us only more slowly. He says: "We are often told that the Bongabonga have discovered the art of smelting iron, or that the Wagga-wagga have invented an ingenious fish trap, but nobody claims to have seen them doing it," whereas actually "—savages—of whom we know anything—are not known ever to have invented or discovered anything." (Linton, in "The Study of Man,"

cites one definite instance to the contrary, of a Polynesian who invented a detachable outrigger about 1900.)

The fact is, continues Lord Raglan, that most of our "primitives" have been in a state of cultural decline since long before the coming of the whites. He cites a formidable list of cases, such as the building of the great structures of Babylon, Uxmal, Zimbabwe, Java, Indo-China, Ceylon, et cetera, whose descendants can build nothing but huts. The Polynesians during their drift across the Pacific lost the arts of textiles, pottery, and metal-working, and when the whites came were abandoning the bow and arrow and their wonderful system of oceanic navigation. The Easter Islanders lost the arts of carving and transporting stone monuments, and picture-writing. In Captain Cook's time they fished from canoes; later they forgot how to make these, and fished by swimming!

His inference is: "We have no more reason to suppose that a man has a natural tendency to degenerate into an ape than that an ape has a natural tendency to degenerate into a lower animal. Nor have we any reason to suppose that all men were once civilized, or even half-civilized. What the facts suggest is that the natural state of man is a state of low savagery, and that toward that state he always tends to revert whenever he is not checked, or forced in the opposite direction, by that unexplained, but highly artificial, localized, and spasmodic process which we know as the progress of civilization."

Raglan attacks the ideas that the similarity of the human mind causes men "naturally" to produce the same

answer to the same problem, or that similar geographical environments produce similar effects on people who live there, or that a barbarian invasion acts as a tonic for a declining civilization. He cites instances where these things simply have not worked that way.

He mentions the Lee-Enfield rifles made by the Pathans of northwest India, saying that if it were not definitely known that the Pathans got their models from Europe, the anti-diffusionists could make just as good a claim for independent invention as they do for such things as the bow, whose history does not happen to be known.

He traces what is known of the history of the bow, domestication of animals, the plow, pottery, the outrigger canoe, the cast-net, the kite, and mummification. Most of these, like the sail, the loom, the brick, wheat-growing, and metal-working seem to have originated in southwest Asia or northeast Africa, in a belt running from Egypt to India.

In this belt there was probably once a great wave of invention, comparable to the European wave that started around 1500. Who the inventors were, or how they overcame the inhibitions and taboos that make invention virtually impossible for savages, nobody knows. Raglan's guess is that they were priests, and the inventions were originally symbolic; used for ritual before they were found to have practical value as well.

Raglan does not drag in a Moovian or Atlantean theory. He thinks the Mexican and Peruvian civilizations were brought from China and India by Polynesians.

Amateur and professional students of the Cause and Cure of Civilization will find this a stimulating book full of surprising ideas. It gives those who wish to an opportunity to do a little worth-while "Buying British."

L. S. de Camp.



CRIME FROM AN ISLAND

● These criminals were led by a genius. And on an island in the Gulf Stream, they perfected equipment that could actually bring a powerful nation to its knees!

● Here's where all Doc Savage's intensive scientific training was needed . . . and he and his trusty aids found it all they could do to cope with the forces that threatened to change the history of the world. Read the thrill-packed novel, MYSTERY ISLAND, in the August

DOC SAVAGE

10c A COPY

AT ALL NEWSSTANDS

THE LUNGFISH AND THE UNICORN, by Wiley Ley. New York: Modern Age Books, 1941, 305 pp.; \$2.75.

This fascinating work, subtitled "An Excursion into Romantic Zoology," is a "must" for Astounding readers—and for Astounding writers as well.

By "romantic zoology" the author refers—in the words of the title of the introduction—to the border lines of zoology, where the science merges into paleontology, paleography, mythology, folklore, the history of science, and simply into we-don't-know-yet.

Thus he deals with the curious ideas that were current in zoology when that science was not really a science but just becoming one. He tells about animals that are not and never were; about animals that ought to be extinct but are not; about animals that ought to exist but by tragic mischance have just become extinct; and most intriguing of all, about an animal that did become extinct but was later *revived*, and is now much alive and bellowing! He describes animals that everybody believed in but which turned out to be myths, and about animals that everybody thought were myths and turned out to be real, and about animals that may be either real or myths.

One chapter has a title that really ought to be used for the name of a fantasy story: The Dragon of the Ishtar Gate. The beast in question is Nebuchadrezzar's sirrush. I shall be surprised and a little disappointed if the sirrush does not soon begin popping up in the stories. Readers will also learn about the tatzelwurm and the gierfugl. Regarding the last, I am personally very glad to have read the book because I recently almost made an ass of myself by calling an early writer a liar for speak-

ing of penguins in Labrador. He was right, it seems.

Here is the story of Gondwanaland and Lemuria. The latter is not a Platonic figment. It is—or rather was—a relic of the former, and was what Madagascar used to be when it stretched clear to India. That is not to say that Lemuria is a plausible site for vanished human civilization: it shrank down to Madagascar some time back, historically speaking. It is named for the lemurs that live in Madagascar today, and when it was Lemuria our own ancestors were pretty near the lemur stage of development.

"The Lungfish and the Unicorn" is a splendid piece of work, clearly and forcefully written. It has been selected by the Scientific Book Club as its book for May, 1941.

L. S. de Camp.

THE BOOKS OF CHARLES FORT, with an introduction by Tiffany Thayer. Published for the Fortean Society by Henry Holt & Co., New York, 1941; \$4.00.

Charles Fort spent a lifetime collecting indigestible and unusable facts. They were facts that could not be fitted into any known pattern, facts that didn't make coherent sense, facts that, seemingly, belonged in a pattern completely new and no part of present-day knowledge. Oppressed by a need to break down the average man's firm belief that he—or at least the professional scientists—knew everything, Fort collected also a noble mass of data relating to instances where scientists had slipped. His books consist then of three essential elements; a collected and semisorted mass of facts that don't fit modern patterns of knowledge—not physics, not chemistry, not geology, not astronomy, they simply don't fit. Second, a col-

lection of errors and slips made by scientists through the last century or so, to prove that there *are* things beyond our knowledge, and that just because a hidebound and overconservative scientist says "Tain't so!" doesn't mean that it can't be true. The third division of material might be called Fort's effort to find some sort of pattern in the material, a vague and rather cloudy effort which I, personally, feel should be ignored. Fort, like any other man faced with that enormous collection of indigestible nonsense-fact was driven to seek a pattern of some sort. From the appearance of things, he could not find the clue facts, or the clue facts haven't been observed yet, so his suggested pattern doesn't make satisfactory sense.

It was partly dictated by the necessity to put over the idea—which most laymen are rather highly reluctant to accept—that science doesn't know it all. Generally, the attitude of the layman has been taken from that of the scientist about twenty years earlier—at the time when the average adult of that particular period was being educated. At the time of Fort's own education, science was convinced of its own all-knowingness, and Fort carried that background into his works. That was the time—before the discovery of radium, the electronics sciences, radio, and the complete breakdown of classical mechanics—when physicists were saying that the next generation of scientists would have to devote their time to a mere determining of the next decimal place. All the important, fundamental work was done.

In all, Fort's valuable work is marred by the attitude toward professional science which was implanted in him before the turn of the century. That high-and-mighty,

we're-infallible attitude embittered him and colored his writing. It did not color his facts, because he simply amassed all the facts he could find which science had not found a place for—and so stated.

Willy Ley's recent article in *ASTOUNDING Science-Fiction*, "The Search For Zero," showed the immense difficulty science had in getting started because they didn't know which facts were basic, which facts to start from. Gradually, science has digested and properly coordinated more and more facts. It has, by its own efforts, discovered further facts not normally observed. Fort's important work was in collecting in one place this mass of the still unco-ordinated, normally observed facts of nature. It is a typical prescience collection without classification, on the same order as the very early cyclopedias of biology that classified all animals that lived in the water—from beaver and otter to codfish and lobster—in one group.

Unquestionably, Fort's collected facts are important. Only—no one yet has been able to find out just how or why, or what they mean. They are, in other words, a perfectly magnificent source-book and challenge to writers and readers of science-fiction. "The Books of Charles Fort" is four complete books—"The Book Of The Damned," "New Lands," "Lo!" and "Wild Talents" in one big eleven-hundred page volume. It probably averages one science-fiction or fantasy plot idea to the page. And—if only we could find the pattern hidden there among the vast jumble of facts—it probably contains the root truths of about four new sciences. It's not all light reading, but it's a vast mine of fascinating material for either science-fiction or fantasy.

J. W. C., Jr.



BACKLASH

By Jack Williamson

Sometimes it isn't the best possible idea to go back in time and have your enemy killed. That can make things even worse—

Illustrated by M. Isip

Now the blizzard had died to a fitful wailing. The aurora shimmered through a dark haze of wind-driven ice crystals. Drifted snow covered half the grounded rocket. Frost cracked sharply in the tiny cabin, and the girl woke.

Challis, cramped with chill in the pilot seat, thought she could have been beautiful. But her pinched face had the blue pallor of the concentration camps, and her thin body was shapeless in the shoddy gray of the New State labor battalions.

She sat up quickly, stiff with sleep, yet somehow graceful. Challis wondered what would happen when she met Captain Dent. Vic Dent was his friend, but a handsome devil, too. And there were few unattached women in the Pantehcon.

She went tense, shuddering.

"Cold, Nadya?" asked the lean American.

"The Yellow Guards"—her dark eyes flicked past him, quick and wary as the eyes of some hunted animal—"I thought I heard them." She peered anxiously through a frost-rimmed port, into the thick antarctic twilight. "Can they find us?"

"I don't think so." With a comforting grin, Challis opened a thermos jug. "We're lucky the blizzard struck. That was three thousand miles behind. Levin's yellow devils probably think we went down in the sea. So cheer up, kid." He splashed smoking tea into a paper cup. "Forget your Russian gloom."

Her haunted eyes were huge and liquid in her starved pale face.

"How can I?" whispered Nadya Stanislav. "You were splendid, to take me away from the labor camp—I don't know how you ever found me. But what's the use?" Her thin shoulders shrugged in the gray. "Where can we go? Levin rules all the world. There's nowhere left."

"My beautiful, hopeless Rahshyan!" The tanned rocket pilot grinned cheerfully. "Drink your tea."

She took one obedient sip.

"Father came from Russia, but I'm American," she protested gravely, "and there's nothing to be gay about. There's no more America. Levin's New State is a dark monster that has swallowed all the world."

The face of Challis went bleak and hard.

"Even America." His voice was

flat and dull. "I was over Chicago, in a rocket fighter, when the Eurasians dropped the first uranatomic bombs. You can't imagine—it was hell—"

He shut his eyes in a useless effort to shut out all the past, and made his hard face smile again. "But now we are free, Nadya," he went on huskily. "We must forget all that's happened—everything but the Pantehcon."

Sleep was soft again in her deep, throaty voice:

"Pantehcon—what is that?"

"The Pantehcon is where we're going," he told her. "We can be there in an hour now. I couldn't tell you before, Nadya—your father's there."

"Father!" Her big eyes were staring and black. "They told me he had been—liquidated." She caught her breath. "Why couldn't you tell me?"

"The Yellow Guards were too close behind, until the blizzard struck," he said. "I thought one of us was enough to take the secret into their little Inquisition, in case we got caught. Understand?"

Biting her white lower lip, she nodded silently.

"The Pantehcon has no defenses except secrecy," he added. "If Levin ever suspect that it exists, that will be the end of everything. The Yellow Guards would scour the world to find us. A single uranatomic bomb could wipe us out—and blot out the last chance on Earth for our kind of life."

"My father?" Her huge eyes were still dark and bewildered; tears rolled out of them. "He's—here?"

"This is one continent where Levin isn't dictator." Challis gestured at the rugged wilderness of ice, dark and hostile under the veil of flying drift. The dying blizzard still made a hollow wailing against the rocket noz-

zles. "Here the only rulers are winter and night and death."

UNCONSCIOUSLY, Nadya drew the shoddy gray closer to her throat.

"They're kinder than the Yellow Guards." Challis turned up the silent electric heater and made a cheerful grin. "Years ago, when we saw the totalitarian storm sweeping the world, we planned the Pantehnicon to protect one seed of civilization."

He gestured toward the freezing dark.

"It's hidden here. A scientific Shangri La, to be a lamp of culture through the dark age ahead. I had money enough to pay for it. I found people I could trust. The job wasn't easy. We had to keep it secret, and Levin moved faster than we expected. But we did it."

A tear splashed into Nadya's cup.

"And father's here?"

"We got Dr. Stanislav out of a Yellow Guard prison four years ago," Challis told her. "He was one scientist we had to save because his work wasn't finished. Probably you know what he had begun?"

Nadya shook her head.

"I was a war nurse, and then counterespionage. It's seven years since I saw him."

"The greatest discovery since the uranatomic generator." His voice lifted with enthusiasm. "He has found a whole new science. Infra-gravitics, he calls it. The forces in the strange borderland between electromagnetics and gravitation. He has done things that will amaze you."

Challis grinned at her.

"You didn't know we came to see you in the prison camp?"

Nadya caught her breath, and her big eyes went dark with bewildered wonder.

"Dr. Stanislav has built a projection cell," Challis told her. "I don't

quite follow the mathematics. But he bends space somehow with an infra-gravitic field. So that you can look across the fold into a place maybe half around the world. That's how we found you, and studied the prison routine to plan the escape."

His brown grin broke her frozen astonishment.

"For all we know," he finished, "your father and Captain Dent may be watching us this moment."

Her dark eyes looked around the tiny cabin uncertainly.

"Who's Captain Dent?"

"Vic Dent was a rocket ordnance expert until America fell," he said. "He helped me plan the Pantehnicon and flew in many a rocket load of equipment himself. Now that job's done, he's your father's research assistant." His grin turned mock ferocious. "Even if Vic is my friend—I warn you."

Her big eyes stared a solemn protest.

"How can we be gay while Levin rules the world?"

"My tragic, lovely Rahshyan." He blew her a cheerful kiss. "Wait till we're safe in the Pantehnicon."

"I'm not Russian, and we'll never be safe." Shivering, she stared into the snow-driven dark. "Nobody ever is safe. The Yellow Guards never give up."

His gray eyes were sympathetic.

"Sometimes it's harder to escape from their memory than it is from the Guards. But let's go." He started the throbbing injectors. "The Pantehnicon is another world."

A CRASHING BLAST broke the rocket free of the grasping frost. It leaped into the flying drift. The aurora shimmered pale across the stars. Surely, Challis told himself, they would never be discovered. Levin

wouldn't trust explorers this far beyond the reach of the Yellow Guards.

At last Challis pointed, shouting above roaring jets:

"There it is!"

Clouds and drift made a ghostly floor ahead. Naked black mountains lifted out of it, cut a jagged line against the pale aurora. A thin gray wisp trailed from the lip of a lofty volcanic cup.

That cloud wisp was all that might betray the Pantehnicon. He thought no chance rocket pilot was apt to guess its meaning. There were live volcanoes in Antarctica. The mountain's flanks were too steep to be scaled on foot in these incessant blizzards, and it would take a brave man to dive blindly into that cloud-filled cone.

Nadya was staring, eyes bright with excitement.

Challis grinned at her and dropped the rocket into the black-walled cup. The dense fog of condensation cut his vision to a few yards, and he snapped on the klystron feeler beams.

For a moment the fog was lit with the blue shimmer of the Nordholm field. Damping out convection currents, the field held in place the insulating cloud that protected the crater from the savage cold above.

The rocket dropped below the ceiling, and Nadya saw the Pantehnicon. Challis heard her breathless cry and turned from the controls. Elation had colored her thin face. He knew that she was beautiful.

He landed on the narrow runway blasted out of the cragged north slope. Nadya hastily powdered her nose as he unsealed the valve. They climbed out, and Challis waved at the sentry in front of the hangar cut into the black cliffs.

"Only one man with a pistol?" Nadya was astonished. "Against all the Yellow Guards?"

"If they find us," Challis said, "nothing is going to help."

From the runway's edge they looked down across the Pantehnicon. The gray cloud roof floated between sheer basaltic walls. Red cattle grazed green meadows on the flat crater floor. A crawling tractor combine was harvesting yellow wheat. Young trees stood softly green along the quiet streets of a red-tiled village. Clear as bells, the voices of children playing ball came up to the high runway.

"Such peace," whispered Nadya. "It can't be real!"

Challis saw her tears, and his voice went matter-of-fact.

"Vaults are cut in the mountain under our feet," he said. "They are filled with the books that Levin has been burning. Our museums contain all the art treasures and scientific equipment we had time to gather."

"We have a few scientists—such as your father. Doctors, artists, engineers. But more of us are just plain common people, farmers and mechanics, carpenters and miners and printers. A couple of hundred, altogether; enough to be a permanent nucleus of civilization."

Nadya gulped back a sob.

"It's all so happy," she whispered. "So bright and warm and quiet. Just like a peaceful country village!" She saw the American flag flying over the schoolyard where the children shouted, and saluted solemnly. "You don't know what that flag means to me." Her voice was choked. "Not unless you've had to kneel in the mud to Levin's lightning banner."

Challis looked away from her wet face; tears made him uncomfortable. He gestured across the bright floor of the black-walled valley.

"Indirect lighting," he said. "New-type fluorescent tubes, powered from the uranatomic generator. The vol-

canic soil is rich enough to grow five or six crops a year. Besides, the hydroponic gardens—"

"Forgive me for going soppy." Nadya dried her eyes. "Let's find my father."

"His lab is in Pantechnicon Tower." Challis pointed at a tall, graceful building beyond the red-tiled town. "See the silver bubble on the roof? That's his projection cell that we used to find you."

WITH A casual greeting to the sentry, Challis led her down a long ramp. Hibiscus splashed huge red blooms beside them, and a mockingbird trilled. A silent electric car stopped at the foot of the ramp, and a tall man got out.

"Vic Dent," Challis murmured. "I warned out."

"I heard your jets, Challis." White teeth smiled out of Dent's brown, handsome face. He wore grease-spotted coveralls like an officer's uniform. Shaking hands with Challis, he spoke to Nadya. "Welcome, darling. We expected you a week ago."

"Yellow Guard trouble," Challis said. "Nadya wants to see her father."

Dent jerked his bare dark head toward the shimmering bubble on Pantechnicon Tower. His lean face looked worried.

"Something wrong?" asked Challis.

"Stanislav's rebuilding the projection cell into some sort of weapon," Dent told him gravely. "He wants to attack Levin. I told him we're safe so long as we just lie low. But he won't listen to reason."

"He's bitter," Challis agreed. "I'll talk to him."

Pantechnicon Tower was the com-

munity's heart. The great uranatomic generator was in its basement vaults. The long wings contained libraries, lecture rooms, and laboratories, planned to keep science a living, growing thing, even in this exile. An elevator lifted them past the administration offices to Dr. Stanislav's laboratory.

The big Russian limped heavily to meet them across a long, cluttered room and took Nadya in his arms. His gray-streaked beard didn't quite hide the long white scar where a uranatomic bomb had burned one side of his face.

"Nadya—my little Nadyezhda!"

Challis and Dent assumed a tactful interest in the big tri-polar infragravitic field coils Dent had been busy winding. Soon Stanislav called:

"Come up to the cell. Challis, I've got something to show you." Emotion quivered in his deep voice. "At last I've got a weapon that Levin can't beat." His dark, hollow eyes looked down at the thin girl. "At last, little Nadya, I can pay back what the Yellow Guards did to Sergei and Sonya, and my poor Alleyueva—"

Gravely, Nadya protested:

"Please, father—let's forget. They are dead, and now we are free. The past is past. It can't be changed."

His haunted eyes glittered.

"Perhaps it can be!" His quivering fingers caught the arm of Challis in a grasp painfully tense. "Come."

THEY CLIMBED a metal stair into the fused-quartz spheroid. A flat copper disk made a six-foot floor. A control post rose out of its center. Stanislav tapped keys upon it, and a muted whine started under their feet. Dent dropped a copper door into place.

Standing close beside Nadya, Challis had a brief glimpse of the

red-tiled town and the dark basaltic cliffs leaping up to the roof of cloud beyond. Then a milky glow filled the quartz. The whine grew louder and abruptly faded.

Challis felt a faint, giddy sensation, as if the copper floor had tilted inexplicably. The pale girl made a little gasping cry and clutched his hand.

"Watch, Nadya." The Russian's voice was strange and harsh with hatred. "I'll show you Levin."

The crystal shell cleared again. Nadya caught her breath and Challis felt her fingers tighten. The crater was gone! The projection cell seemed to be floating with them, high over a dark, featureless landscape.

Watching a little illuminated chart, Stanislav tapped his keys. That dark, flowing world became

fixed and brighter. Above a sprawling city, Challis saw an immense and ornate tower. Upon the tower stood a colossal statue of a man in uniform. One mighty fist was lifted in salute, and sodium-vapor tubes made yellow lightning flashing in its clutch.

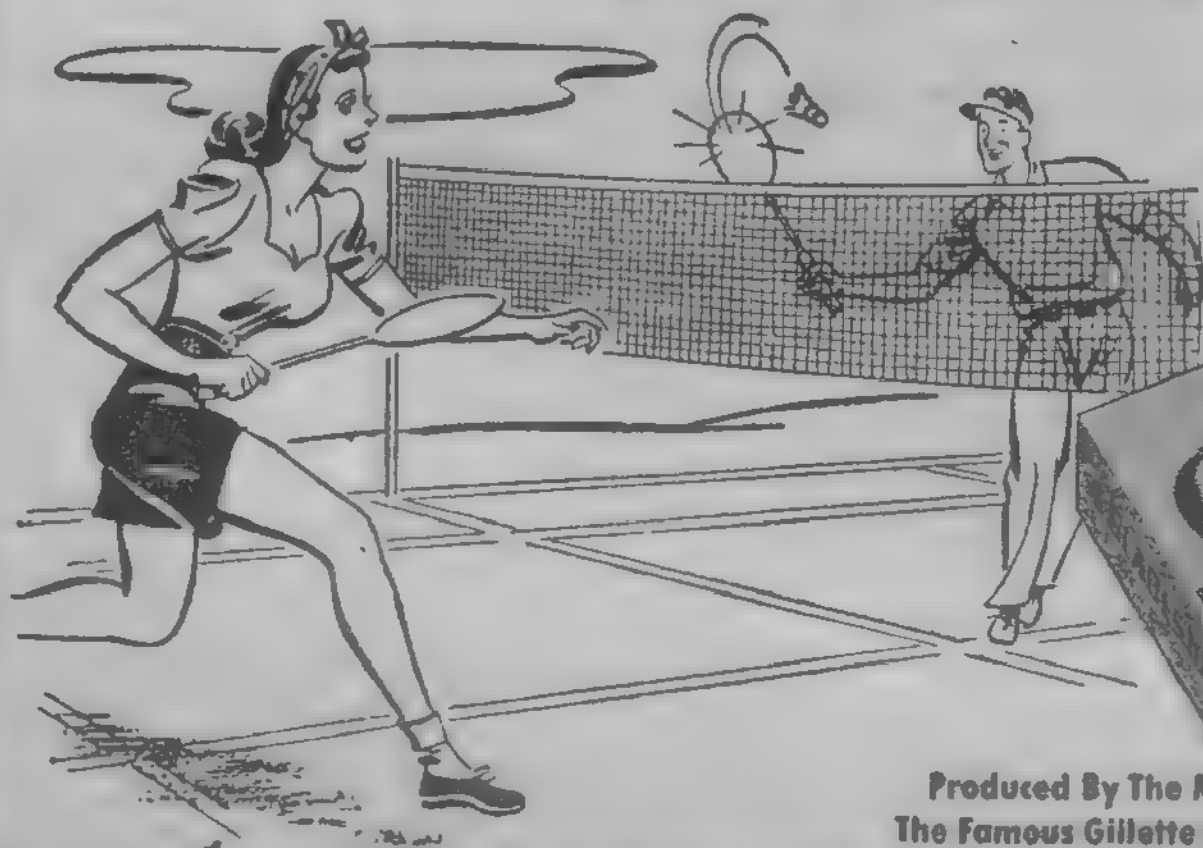
"The statue of Levin." Dent's hard voice was crisp as a guide's. "At the New State capitol."

Stanislav tapped the keys, and they dropped toward the streets. Beneath the colossus, gray death flowed in an endless river: gray-pointed tanks and guns and armored cars, and ranks of robot-faced men in gray.

"The Yellow Square." Dent's voice held no emotion. "And there is Levin."

Challis found the stand at last, draped in black-and-yellow lightning banners. Beneath his colossal statue,

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the black-mustached man in uniform looked oddly insignificant:

"Levin!" Nadya whispered hoarsely, and her eyes were dark with dread. "Reviewing the army that conquered the world!"

Angrily, Stanislav's blunt fingers fell hard upon the keys. The crystal bubble turned milky, once more. When it cleared, the Yellow Square was gone. They were floating low over a pen fenced with barbed wire. Ragged men huddled in it, unsheltered, knee-deep in mud.

The Washington Monument stood lonely in the gray background.

An Eurasian officer snapped an order. The gray-clad guards turned their machine guns through the fence. The sound seemed queerly remote in the quartz cell. But the prisoners toppled into the mud. Challis started, biting into his knuckles.

THE CRYSTAL SHELL glowed and cleared again. The whine was louder once more. The fields were bright and peaceful beyond the red-tiled town, and black cliffs soared to the flat roof of cloud.

Pale and shaken, Challis stared at Stanislav.

"I thought," he gulped, "there were faces I knew. I saw the President of the United States." He

shook his head, bewildered. "But the Washington Massacre happened last year."

The bearded man nodded.

"It did," he said. "And Levin's victory parade, in the Yellow Square, was three years ago." His hollow eyes burned with elation. "With the new tri-polar units I can deflect the projection field back through time.



That's where I'm going to attack Levin—in his vulnerable past."

"In the past?" Challis blinked. "Things that have happened can't be changed. The future, maybe. But the past is real."

"Reality is relative." The dark, sunken eyes of Stanislav were almost hypnotic. "Science has yet to find any absolute. The statistical mathematics of probability has conquered. The facts of yesterday are merely more probable."

Challis shook his head.

"If we live in a world that is merely probable, how are we to know it?"

"We don't." The big Russian shrugged. "Suppose the probability against your existence here is a million to one. If the universe around you is on the same plane of probability, you cannot determine the fact. Everything else is equally tenuous. For you, in your own particular strand of cause and effect, your own probability of existence always appears to be one hundred percent.

"But the absolute is always illusion. The past is merely relatively probable. There is a continual branching and diffusion of probability in the direction of the future. It is that which points the arrow of entropy.

"Exploring the past, we seemed to be merely phantasmal observers, unseen, without power to influence the things we saw. But in fact there are certain nodes of probability at which we should be able to deflect the arrow of entropy and increasing probability, and so determine the course of future events."

Challis looked doubtful.

"Then aren't we lifting ourselves by our own bootstraps?"

"The Pantehnicon is isolated from the world," Stanislav pointed out. "That enables it to serve as a fulcrum—that we can use to lever Levin out of existence!"

He caught a rasping breath as Challis asked:

"What is a node of probability?"

"I've found one in Levin's life." Hate grated in the Russian's voice. "His parents, you know, were shot for intellectuals when he was a child. Afterward his uncle tried to escape to America with the boy—Levin was ten years old.

"They almost made it. They were

crossing the frontier when Levin was wounded and captured by a guard. If the bullet's course had been changed through a fractional degree the boy would have died.

"And the arrow of entropy would have been deflected along a different track of probability."

"You can't change that bullet's course?"

"But I can." The Russian's voice rang harsh and resolute. "We have the power of the uranatomic generator. We have the infra-gravitic field through which to apply it. We have an isolated fulcrum for it to react against." Fever burned in his hollow eyes. "Levin is doomed!"

CAPTAIN DENT leaned protestingly over the control post.

"Why, doctor?" His voice was low and urgent. "Why not leave things alone. I tell you, Levin isn't the monster you think. You see, I knew him."

Stanislav's face went dark with suspicion.

"I was military attache at the Eurasian embassy," Dent explained, "when Levin was just an ex-lieutenant in aviation. He was experimenting with rockets—my specialty—when he wasn't expounding his half-baked New State ideology in some beer joint. He wasn't a bad sort. Except, like yourself, he was bitter about things that had happened in the past."

Stanislav trembled angrily, rasping:

"You talk like an Eurasian spy." He turned to Challis and the girl. "Listen to my plan. I have already proved that I can look back into the past, even with the experimental thousand-kilowatt field coil. As soon as the new unit is finished and installed—"

Dent's anxious voice interrupted:

"Challis, you're director of the Pantechnicon. You own it, really. Are you going to allow such a thing?" His lean brown face looked tense and desperate. "You planned this for a repository of culture. Don't you realize that violence is fatal to culture?"

"No more fatal than passive surrender," Challis said. "The Pantechnicon is a democracy. I have kept no authority for myself. If the thing came to a vote, Stanislav might win—if he could really stop Levin. None of us here are friends of the New State."

"If you are all insane—"

Dent choked off his angry voice and stamped out of the room. Fifteen minutes later Challis heard the scream of rocket jets. Blue flame was swallowed in the gray cloud ceiling. At the hangar, Challis found the sentry nursing a scalp wound.

"It was Dent," the sentry gasped. "He gave me this before he hit me."

The crumpled note was addressed to Challis:

Sorry, old man, but Stanislav hit the mark. I really joined you as a New State secret agent. I liked the original purpose of the Pantechnicon. But this mad plan to murder Levin recalls me to a duty I had almost forgotten. I can't begin to express my regret. So long.

VIC DENT.

Challis stared down across the red-tiled town, and the white tower, and the bright fields cupped within the sheer black cliffs. The note fluttered out of his stiff fingers.

This meant the end of the Pantechnicon.

Levin's rocket base at Capetown was only four or five hours away. No defense was possible. A single uranatomic bomb could sear all life from the crater. The triumph of the

twisted, fantastic New State ideology would be complete.

Unless—

Challis caught his breath and hurried back to the Pantechnicon Tower. If Stanislav's plan would work at all, they had no choice but to try it now. There might be time to finish winding the new field coil and get it installed before the rocket bombers came.

STILL, eight hours later, no bellow of rockets had come through the gray cloud roof. The new coil was wired in place beneath the copper disk. Challis followed the limping Russian up into the big quartz bubble. Anxiously, Nadya begged from the stair:

"Father, may I come, too?"

Stanislav shook his scarred, haggard head.

"No, my little Nadyezhda," he protested. "I'm afraid there's too much danger. The first bomb will surely destroy the projection cell here on the tower. We can't really escape into the past, remember. There is merely a tenuous projection that lasts only so long as the field is maintained by power from the generator here. You'll be safer with the others in the library vaults."

Her dark, frightened eyes looked pleadingly at Challis.

"Please—"

But Stanislav dropped the copper door and started the whining mechanism.

"There's no time to waste. Dent's first bomb will cut off the power and leave us helpless." He thrust a worn notebook into Challis' hands. "Here are the components of Levin's node of probability. Read them while I set them up."

Challis read what seemed a confused jumble of symbols while Stanislav tapped the keys. Once again the whining faded while the quartz

wall was filled with cloudy opalescence. At last it cleared, and the black cliffs had vanished.

Gray light of an overcast dawn showed a landscape of snow-clad hills. A two-wheeled donkey cart was creeping out of a straw-thatched village. Above the road stood a gray concrete pillbox. Stanislav pointed to the barbed-wire fence along the wooded ridge above.

"The border fence." His voice was hoarse and strained. "Forty years ago. Levin is driving the cart. His uncle is hidden in the straw. But watch."

The cart stopped where trees grew near the road. The boy leaped from the seat and a man in peasant costume burst from the load of straw. They floundered through deep snow toward the fence along the ridge.

Stanislav tapped his controls again, and the quartz bubble seemed to float toward the little concrete fortress. Challis saw the stocky, swarthy soldier stationed outside of it, stamping his feet on hard-packed snow.

The guard saw the fugitives running through the trees and snapped his rifle level.

"Watch," rasped Stanislav. "The first shot kills the uncle."

The bubble sank into the snow. Stanislav tapped the keys, and it moved until the guard was apparently beside them, within the quartz globe. Unaware of them, he deliberately fired the rifle. The sound was a tiny snap, but the running man pitched to his face in the snow.

The boy knelt beside his uncle for an instant and then floundered on desperately. The guard spat with satisfaction and worked the rifle's bolt and lifted the weapon to his cheek again.

"Now!" The Russian's voice was low and desperate. "The bullet just grazed Levin's head in the past we know. And the range is three hundred yards. It won't take a great

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deflection of the rifle barrel to make the wound fatal. Get ready!"

THE THICK steel barrel felt cold and solid to Challis. It seemed strange that the squinting guard couldn't see them. Stanislav kept his eyes on the moving chart and the lighted dials beside it. Low and savage and triumphant, his voice croaked:

"Three seconds, two, one—*now!*"

Challis flung all his strength against the steady barrel. His muscles cracked with effort, but it didn't seem to move. He watched the quivering needles. Somehow, he knew, a million kilowatts of energy was flowing through his body. But it wasn't merely a gun that he pushed against. It was the inertia of a world.

"Harder!" gasped Stanislav. "Can't you—"

Challis surged desperately. A needle quivered. The gun jerked in his hand. The sentry spat again and ejected the fired cartridge. Far away, the running boy dropped limply into the snow. The Russian's scarred face twisted with elation.

"We've done it," he shouted. "Levin's dead!"

Trembling with eagerness, he tapped the controls.

"Levin's dead," he rasped again. "The whole structure of probability is altered. Let's go back to see the new world we have made." Milky light hid the stamping sentry and the dead youth in the snow. "Without Levin's military genius, Eurasia could never have conquered the West. The democracies must have triumphed. Let's look at England."

The white mist cleared again.

"Here," whispered Stanislav, "is Lond—"

His voice was gone and his jaw fell slack.

A blood-red sun burned dimly in

a strange copper sky. Red mud stretched in endless flats, cut with black, sprawling gullies. A few skeletal girders jutted out of the mud. A gully was dammed with shattered masonry. Nothing else showed that men had ever been here.

There was nothing alive. No wing moved in all that brazen sky. There was only red dust blowing out of the west. Stanislav made a choked, stricken sound and tapped the keys again.

Hoarsely, Challis whispered:

"What ghastly thing caused that? Let's see if America escaped."

The crystal sphere clouded again and cleared. But America was no different. The naked land was slashed with wind and rain. Red alluvial flats spread desolate from every elevation, and new canyons slashed them. Stanislav shrugged hopeless.

"The world was like this," he muttered, "before life ever came out of the sea."

"Why?" whispered Challis. "We must find the cause."

YEAR BY YEAR they probed the past, until they found a city on the eve of its doom. Millions had fled, uselessly. The few who remained were coughing, clutching their throats, dying. The bodies crumbled, and red dust swirled on the high west wind.

Stanislav dropped the cell beside an abandoned newspaper stand, and Challis read the black-lettered warning:

VIRUS THREATENS AMERICA

Washington officials admitted today that all efforts have failed to discover protective measures against the "red dust." This is now established to be a synthetic virus, which destroys all organic matter. It is believed to have been developed by Eurasian military biologists as a weapon against the Anglo-American Army of Occupation.

If that is true, its creators were the first to be destroyed. The most of Asia is reported already desolated, and every dust storm—

A tiny reddish mote fell upon the faded page. A ragged hole swiftly grew. The sheet crumpled into crimson dust, and a red wind swirled it across the pavements. A running man tore the dissolving mask from his face and clutched his throat and died.

The keys clicked, and kindly light obscured the crystal walls. Challis stared at the old Russian, too ill to speak. Hunched over the control pillar, Stanislav looked haggard and hopeless and old.

"I'm turning back." His dull, hollow eyes watched a trembling needle. "Now something is wrong back at the Pantehnicon. The power's failing. If the field collapses while we are projected, I think we shall be electrocuted."

That didn't seem to matter.

"The red dust—" Challis shuddered, imagining that swift and terrible decay in his own lungs. "It must have swept the whole world, except Antarctica."

"Don't you remember?" The hollow eyes of Stanislav glittered at him queerly. "That was nine years ago."

Challis felt confused and ill.

The bubble cleared again. He peered out in dull-eyed wonder. This was the crater. But the Nordholm field had failed, and the roof of cloud was gone. The lights were out. Under the pale aurora, the fields looked black with frost. Nothing moved. The Pantehnicon was dead.

"I don't see anybody," he rasped anxiously. "Where's Nadya?"

The old Russian's voice seemed dull and remote:

"Nadya isn't here." He made a slow, confused shrug. "Don't you remember? Nadya never got here."

His scarred fingers gripped Challis' arm. "It is just us two."

Challis jerked away.

"Nadya—I've got to find her!"

For Nadya was life in this empty world where dreadful death had conquered. He flung up the copper door and ran down the metal stair. The laboratory was dark and musty and cold. He called Nadya's name in a voice turned thin and sharp. Only emptiness answered.

"Nadya isn't here—remember?" It was her father's voice, croaking down the stair. "But perhaps we can bring her back. See if you can fix the generator while I check the components we observed. We've got a job to do—remember?"

The bitter memory came back. No wonder he had tried to forget. Of course Nadya wasn't here. She had been lost, with Vic Dent and the rest, nine years ago. The red-dust virus must have got into the rocket before they left America.

The elevator wasn't working, and even the battery-powered emergency lights had almost failed. Already shivering, Challis felt his way hastily down the winding stairs to the generator vaults.

The dead machine was suddenly familiar. For nine years he and old Stanislav had been alone here, the only men alive. For nine years he had tended this generator. Now the last uranium-cathode element was almost burned out, and there were no more spares. Carefully he reset and realigned the thin, pitted fragment of the plate, sealed the safety door and tripped the ignition bomb.

The lights came on again. Challis hurried back to the time cell. Stanislav was hunched over the control pillar, making swift calculations and setting the keys. He looked up quickly, with a silent question in his haunted eyes.

"A few minutes," Challis said. "Maybe an hour, if we don't overload it." His hands spread in a helpless gesture. "The end of the last plate. When it's gone, we are." He peered at Stanislav's scrawled notations. "Have you got anything?"

"The analysis proves my point." Hunched over the keyboard, the bearded Russian muttered abstractedly. "Violence results only in violence. The red dust was a violent result of the violent suppression of Eurasian nationalism by the white races."

His blunt fingers tapped the keys.

"However, to find the node of probability, we must go farther back. I found the creator of the virus. He was once a village clergyman. He saw a small boy shot down by a frontier guard. It was that last bit of ruthless violence that made him change his vocation, to become a military biologist.

"That boy's death is the factor we must alter."

"We haven't much power left," Challis reminded him, "to alter anything."

ANTARCTIC COLD was already deadly in the crystal cell. But Challis dropped the copper door, and Stanislav started the whining converter. A milky glow once more veiled the black cliffs and the triumphant night. It cleared again, and Challis saw a winter dawn.

Snow lay on wooded hills. A low gray concrete pillbox stood near a border fence with a stamping guard beside it. Stanislav tapped his keys to drop them toward the oblivious guard. He pointed to a donkey cart creeping out of a straw-thatched village.

"You know," Challis murmured, "I've got the queerest feeling we've done this before."

"Nonsense," muttered the Russian. "Common illusion—there's a word for it." He brought them down beside the guard. "Get ready to push if the power holds."

A man and a boy jumped out of the cart. They floundered toward the fence. The guard fired deliberately, and the man dropped in the snow. He spat and reloaded and aimed at the running boy.

"Three seconds!" rapped Stanislav. "Two, one—*now!*"

Challis flung his strength against the rifle barrel. But the inertia of a whole dead world held it firm, and he was a feeble ghost. A needle flickered on the post and his hands slipped through the steel.

"The power—" gasped Stanislav. "Try again—we've got to save that boy!"

The needle came back, and Challis clutched the gun. It seemed queer the guard didn't see them. For the gun was real again, and he thrust with all his strength. The rifle jerked. Three hundred yards away, the boy dropped limply.

"He was hit," Stanislav whispered brokenly. "Perhaps only wounded, but they will capture him." He stared at the dials. "Now the field is failing. We can't try again."

"But—look!" Challis glimpsed a slender figure vanishing among the trees. "That was just to confuse the guard. He wasn't even wounded. He's already safe, beyond the fence."

The old Russian whispered faintly:

"I wonder what that boy will do."

"Let's look ahead," urged Challis. "Let's find out."

But Stanislav had stiffened with alarm.

"The field's too weak already," he said. "We must get back to the Pantechicon before it collapses."

His tense hands fell on the keys.

Milky light flooded the crystal walls again and died. Challis saw the crater's black and cragged rim. The Southern Cross was pale and cold above. Deep snow buried all the buildings of the Pantech-nicon, as if they had never been. Frozen drifts covered the tower, even, to the level of the time cell.

THE time cell—what was that? Challis, sitting cramped and stiff in the pilot seat, shook his head against the numbing lethargy of cold. He listened again to the hoarse, droning voice of old Stanislav at the klystron-beam communicator:

"Experimental Rocket *Venus III* calling Space Station A. Please relay to Captain Dent, Antarctica Station. We are down in Liberator Crater. Generator burned out. Main communicator dead. Please rush relief."

Stanislav stopped and listened to the phones.

Challis turned stiffly. Cold and concussion had him groggy. Lucky he had been able to drop the crippled rocket into this deep snow, or they wouldn't be alive at all. They wouldn't be, much longer, unless somebody answered.

"What has become of the Pantech-nicon?"

The question sounded strange, as if somebody else had asked it. Stanislav blinked in a dull, bewildered way. He made a weary shrug and laid aside the phones.

"Probably wasting the battery," he muttered. "No way to tell whether Station A is above the cliffs." His dark, hollow eyes were puzzled. "What did you say about a pantech-nicon? Isn't that a sort of moving van?"

"I don't know." The cold was a kind narcotic, and Challis murmured sleepily, "I don't remember."

The old Russian made a troubled frown.

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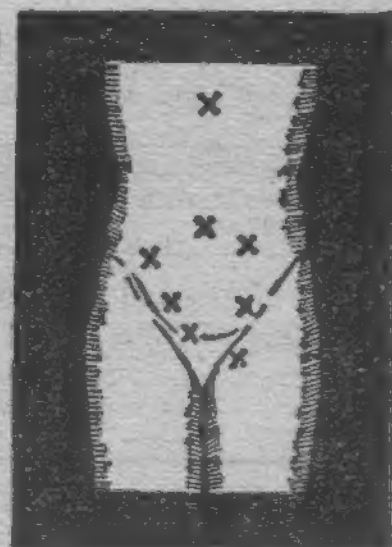
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"There's a name I've been trying to think of—L-something." Slow, numbed hands tugged at his beard. "Levin—that's it!" His sunken eyes were worried. "But I don't know what it means. Have you ever heard the name of Levin?"

Challis stared at him.

"Isn't that an old word for lightning?" Then he started against the clutching cold, and his stiff face smiled. "Now I remember! I used to know the Liberator—we were in the same semantics classes at Tech. His childhood had been rather terrible, you know, before he escaped to America. Violence had left a mark on him. He used to write some pretty savage articles for the collectivist press under the pen name of Levin. It's fortunate for the world that American democracy soon cured him of that bitterness.

"But what did you want to know?"

"I've forgotten." Stanislav shrugged, and his stiff hands picked up the phones again. He repeated the call for aid, while Challis pounded his knees to fight the creeping cold. Suddenly Stanislav begged for quiet. Challis tried to keep awake.

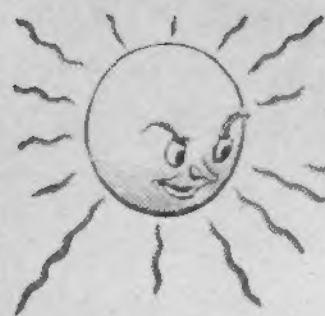
At last the old Russian dropped the phones.

"That was Nadya!" Hope burned again in his hollow eyes. "Relayed back from Antarctic Station. She says her husband has already blasted off in the relief rocket. He'll be here soon."

"Good old Vic!"

But the cold was a heavy narcotic, and Challis let his mind drift again. In spite of all her Russian gloom, Nadya Dent was very beautiful. If Vic Dent hadn't met her first, he thought sleepily, things might have been different.

THE END.



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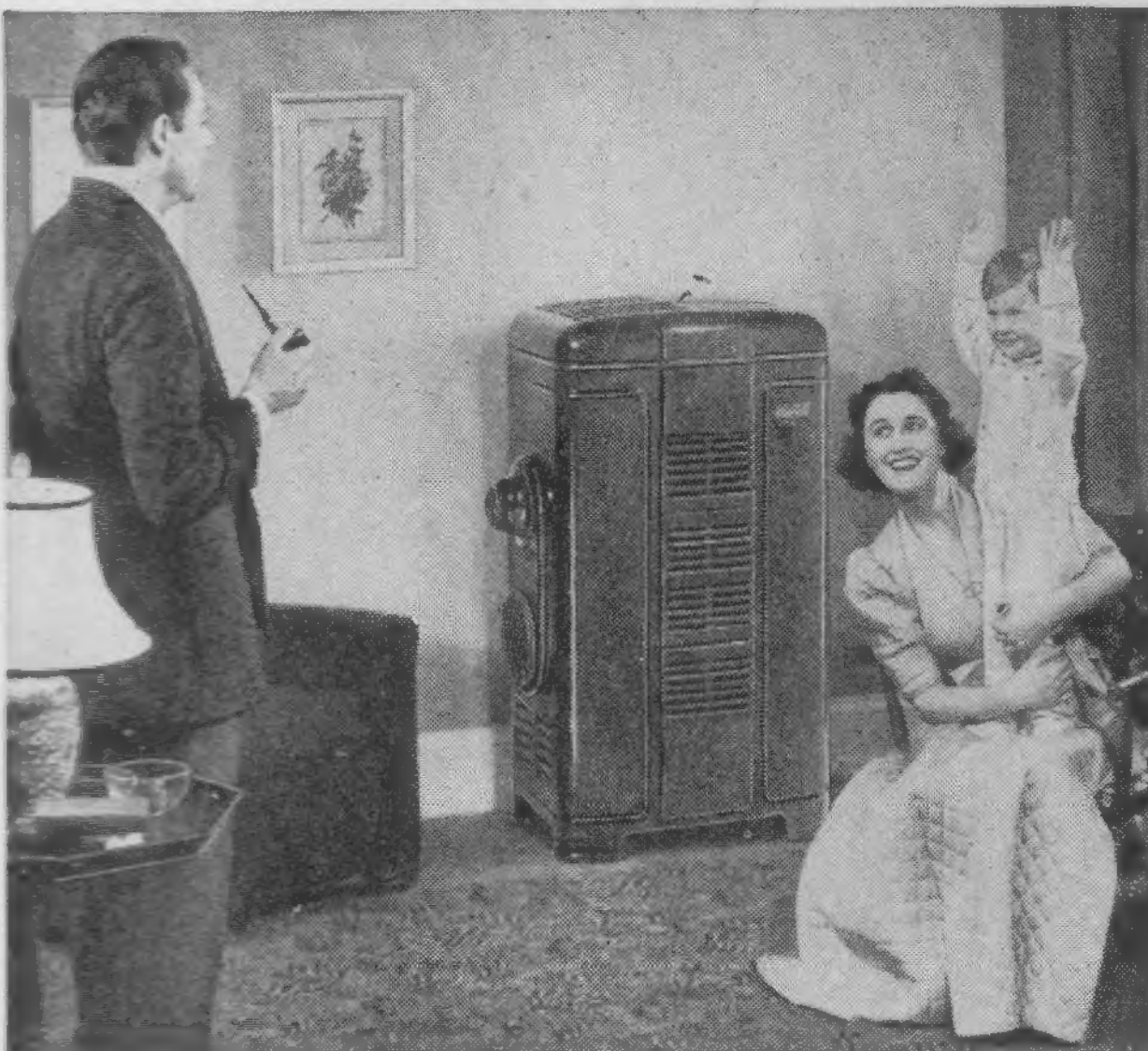
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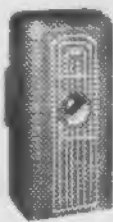
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